Principles for Responsible Banking:
Guidance for banks

UN environment programme | finance initiative

Principles for **Responsible Banking**



Circular Solutions to Achieve Nature Targets

Circular Economy as an Enabler for Responsible Banking

September 2026

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All feedback on the Guidance is welcome. If you would like to provide feedback on this guidance, please reach out to simona.weber@un.org or kavita.sachwani@un.org or peggy.lefort@un.org.

Acronyms and abbreviations

ANR	Assisted natural regeneration
ASC	Aquaculture Stewardship Council
AWS	Alliance for Water Stewardship
BBNJ	Biodiversity Beyond National Jurisdiction (Agreement); also known as the High Seas Treaty
CBD	Convention on Biological Diversity
CDP	Carbon Disclosure Project
CLT	Cross-laminated timber
CSRD	Corporate Sustainability Reporting Directive
DBFOT	Design-build-finance-operate-transfer
DBO	Design-build-operate
DFI	Development finance institution
EMF	Ellen MacArthur Foundation
ENCORE	Exploring natural capital opportunities, risks and exposure
EPR	Extended producer responsibility
EUDR	EU Deforestation Regulation
FAO	Food and Agriculture Organization of the United Nations
FSC	Forest Stewardship Council
GBF	Kunming-Montreal Global Biodiversity Framework
GDP	Gross domestic product
GHG	Greenhouse gas
HAM	Hybrid annuity model
ICMA	International Capital Market Association
IFC	International Finance Corporation
IMTA	Integrated multi-trophic aquaculture
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IoT	Internet of things
IPCC	Intergovernmental Panel on Climate Change
IRP	International Resource Panel
ISIC	International Standard Industrial Classification of All Economic Activities
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated (fishing)
KPI	Key performance indicator
KYC	Know your customer
LCA	Life cycle assessment

LEAP	Locate, evaluate, assess, prepare (TNFD approach)
LEN	Landscape Enterprise Networks
MRV	Monitoring, reporting and verification
MSC	Marine Stewardship Council
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne (EU statistical classification of economic activities)
NASA	National Aeronautics and Space Administration
NBSAP	National Biodiversity Strategy and Action Plan
NbS	Nature-based solutions
NDC	Nationally Determined Contribution
NGFS	Network for Greening the Financial System
NGO	Non-governmental organization
NOAA	National Oceanic and Atmospheric Administration Fisheries
NTFP	Non-timber forest product
PEFC	Programme for the Endorsement of Forest Certification
PES	Payments for ecosystem services
PRB	Principles for Responsible Banking
RAS	Recirculating aquaculture system
REDD+	Reducing emissions from deforestation and forest degradation, plus conservation, sustainable management of forests and enhancement of forest carbon stocks
RSPO	Roundtable on Sustainable Palm Oil
RTRS	Round Table on Responsible Soy Association
SBTN	Science Based Targets Network
SDG	Sustainable Development Goal
SME	Small and medium-sized enterprise
TNFD	Taskforce on Nature-related Financial Disclosures
UNCTAD	United Nations Trade and Development
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
USAID	United States Agency for International Development
WRI	World Resources Institute
WEF	World Economic Forum
WWF	World Wide Fund for Nature
ZLD	Zero liquid discharge

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Executive summary

The global economy remains deeply embedded in a linear model of "take-make-waste" that has proved incompatible with planetary boundaries. Resource extraction has more than tripled since 1970, and current material use is projected to double by 2060 in the absence of structural change (UNEP, 2019). The ecological consequences are severe: it is estimated that the extraction and processing of natural resources account for more than 90% of global biodiversity loss and water stress, and approximately half of global greenhouse gas (GHG) emissions (IRP, 2019). Land-use change, overexploitation, pollution, climate change and invasive species—all amplified by linear production and consumption systems—rank among the five main direct drivers of biodiversity loss (IPBES, 2019).

This ecological decline has profound consequences for economic resilience, human prosperity and financial stability. It is estimated that more than half of global GDP—around US$ 44 trillion—is moderately or highly dependent on nature and its services (WEF, 2020). In the World Economic Forum's Global Risks Report, biodiversity loss and ecosystem collapse rank second among the most severe global risks over the next ten years, followed by critical change to Earth systems (e.g. tipping points such as ice sheet collapse) and natural resource shortages (WEF, 2026a). Yet these risks remain largely unpriced, as markets systematically treat nature's degradation as an externality rather than reflecting it in costs and capital allocation (Khemka and Eberhard, 2025). Current finance flows mobilized for nature-based solutions (NbS) total just US$ 200 billion a year, less than one-tenth of energy transition investments, with the private sector contributing less than 20% of this funding (UNEP, 2023). This leaves an annual funding gap of around US$ 700 billion to meet the 2030 goal for sustainable biodiversity management and ecosystem integrity (CBD, 2022a).

The circular economy can play an important role in supporting this ambition by offering an alternative to linear production and consumption models through resource efficiency, product life extension, regenerative inputs and closed-loop systems. Circular material flows could reduce global GHG emissions by 39% and material-related environmental pressures—including land use, water consumption and biodiversity impact—by up to 28% (Circle Economy, 2021). According to a study by Sitra (2022), circular interventions across multiple sectors could enable global biodiversity to recover to its year 2000 levels by 2035. These environmental benefits are accompanied by growing commercial opportunities, as circular business models can generate efficiency gains and new revenue streams while reducing exposure to resource depletion and ecosystem degradation (IPBES, 2024; IRP, 2024).

For banks, this creates opportunities to finance and advise clients through a transition that can strengthen business resilience and competitiveness, while opening new areas of economic activity and reducing nature-related risks across lending and investment portfolios. This guidance provides practical, sector-relevant direction to act on these opportunities, aligned with the Principles for Responsible Banking (PRB), the Kunming-Montreal Global Biodiversity Framework (GBF), existing PRB nature guidance, the Taskforce on Nature-related Financial Disclosures (TNFD) "Locate, Evaluate, Assess, Prepare" (LEAP) approach and other relevant frameworks.

The document is organized around three ecosystem categories—ocean and marine; freshwater; and terrestrial and land—that together cover the primary nature-related exposure and opportunity landscape for banks. For each, it highlights key pressures and threats, identifies priority circular interventions refined through an interactive process with a working group of 26 banks, and maps how these can mitigate risks and unlock value. The guidance then translates these opportunities into concrete actions across policies, client engagement, financing, and partnerships, focusing on the sectors and business models most relevant to banks. Case studies provide practical examples of emerging practice.

1. Connecting the circular economy to nature targets

1.1 The circular economy—nature nexus

The circular economy offers a coherent and actionable framework for addressing biodiversity loss, driven in large part by how economies extract, use and dispose of resources. Rather than following a linear "take-make-waste" model that continuously draws down natural capital, circular solutions and business models decouple economic activity from resource consumption and environmental degradation. In doing so, the circular economy helps tackle the five key drivers of biodiversity loss identified by the IPBES (2019):

- **Changes in land and sea use** represent the single greatest threat to biodiversity globally, as habitats are cleared, degraded, or converted to meet the economy's insatiable demand for virgin materials. The extraction and processing of materials alone accounts for 90% of land-use-related biodiversity loss (Tasaki and Jaeger, 2025), with cropping and animal husbandry now occupying around 50% of the world's habitable land (Schröder and others, 2021). By keeping materials in use for longer—through better design, repair, reuse, remanufacturing and recycling—the circular economy fundamentally reduces the pressure for more extraction and land clearance and leaves nature more space to persist and recover.

- **Overexploitation of organisms and natural resources**—from overfishing to the unsustainable harvest of timber, minerals and water—has pushed countless species and ecosystems beyond their capacity to recover. Over the last 50 years, wildlife populations have declined by almost 70% and one million species are at risk of extinction in the next few decades (WWF, 2022). The circular economy shifts resource use from short-term extraction to stewardship, thereby reducing material demand, redesigning food systems and managing renewables within natural regeneration limits.

- **Climate change** is disrupting temperature regimes, ocean chemistry and seasonal patterns species have relied on for millennia. As material extraction and processing drive more than 55% of global emissions, the circular economy is key to cutting GHG emissions—by extending product lifetimes, using recycled over virgin materials, and designing out waste (Tasaki and Jaeger, 2025). Banks are invited to consult UNEP Finance Initiative's previous guidance, *Circular Solutions to Achieve Climate Targets*, together with its sector-specific supplements, to support the integration of circular economy principles into climate strategies, financing approaches and transition planning (UNEP FI, 2025a).

- **Pollution** of soils, waterways, and oceans degrades habitat quality and threatens the organisms that depend on it. Plastic, for instance, now makes up 80% of all marine debris found from surface waters to deep-sea sediments (IUCN, 2024). Meanwhile, nitrogen and phosphorus run-off from agricultural fertilizers and animal waste is driving eutrophication to become one of the leading causes of water quality impairment globally. More than 415 coastal dead zones are now recorded

worldwide (WRI, 2008)—a number set to double by 2050 as fertilizer use continues to grow (Glibert and others, 2008). Rather than managing pollution after the fact, the circular economy designs it out at every stage of a product's life cycle—phasing out hazardous substances, closing material loops and eliminating the fertilizer run-off and toxic discharges that the linear economy treats as unavoidable (EMF, 2013).

- **Invasive alien species** cause profound ecological disruption when introduced into ecosystems in which they did not evolve, often outcompeting native species and unravelling food webs that took millennia to form. A significant and underappreciated pathway for their spread is the global movement of waste—in packaging, ballast water, soil and organic material (Haubrock and others, 2026). By designing out waste at every stage and closing material loops, the circular economy reduces the physical vectors through which invasive species travel, limiting one of the more insidious and hard-to-reverse mechanisms of biodiversity loss.

As illustrated in Figure 1, the circular economy provides a systemic response that addresses root causes rather than treating symptoms in isolation. Through its three core principles—eliminating waste and pollution, circulating products and materials, and regenerating nature—the circular economy can address the five IPBES drivers at source, reducing pressure on ecosystems, maintaining the ecosystem services on which businesses depend, and contributing to reversing the trajectory of global biodiversity loss (EMF, 2021a).

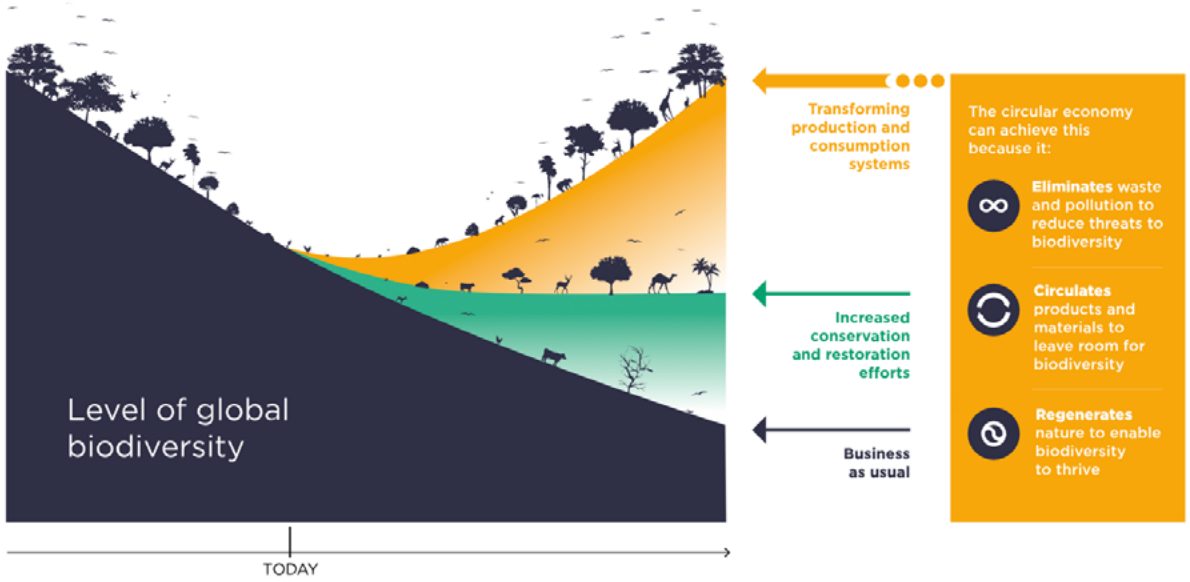


Figure 1: The circular economy's role in bending the curve on biodiversity loss. Source: EMF (2021a)

1.2 The business case for circular economy finance

Nature underpins economic activity through essential services such as clean water, fertile soils, pollination, climate regulation and coastal protection, while natural resources provide critical inputs across sectors. The ongoing degradation of ecosystems and their services therefore creates material business risks, affecting revenues, operating costs, asset values and the ability to repay debt. Yet these risks have long been underestimated, as nature loss is largely treated as an externality rather than being reflected in prices, valuations and capital allocation decisions. As a result, nature-related risks have continued to accumulate while remaining underpriced in financial markets (Khemka and Eberhard, 2025).

Banks are increasingly recognizing the financial implications of these risks and their potential impact on loan books, investment portfolios and the long-term creditworthiness of clients. Nature dependence is widespread across sectors—from agriculture that relies on pollination and soil health, to manufacturing dependent on natural resource inputs and water-intensive processes, and real estate vulnerable to flooding and coastal erosion as natural protective systems degrade. Banks' exposure to these activities can translate into client-level disruptions, reduced revenues and potential defaults, affecting credit quality and loan performance. Additionally, transition risks emerge as banks face stranded asset exposures from financing environmentally harmful activities, alongside growing regulatory momentum on disclosure and accountability for nature-related risks (NGFS, 2024; TNFD, 2023). At least 29 jurisdictions totaling more than US$ 77 trillion of banking assets have started to consider nature risk in their prudential frameworks (UNEP FI, 2024a). Figure 2 shows how these exposures fall into two channels now standard across the NGFS and TNFD frameworks—physical risk, as ecosystem degradation disrupts nature-dependent borrowers, and transition risk, as policy, market and litigation shifts penalize nature-harming activities.

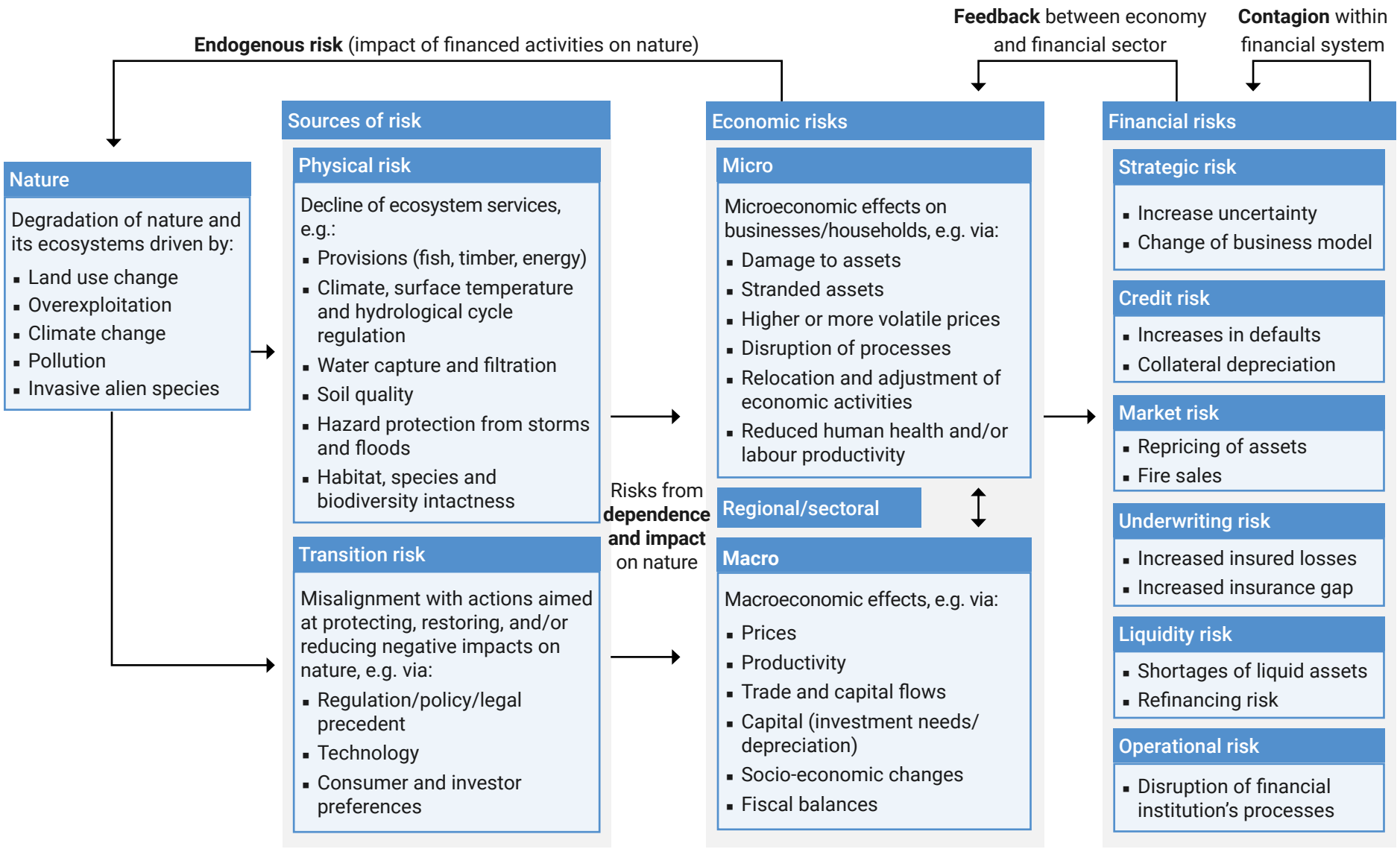


Figure 2: Transmission channels through which nature loss can lead to financial risks. Source: UNEP FI (2024a), based on NGFS (2024)

The circular economy provides a pathway for managing these risks by reducing reliance on scarce or degraded natural resources, lower exposure to tightening environmental regulation and mitigate operational disruptions associated with ecosystem degradation (EMF, 2021a; Zara and others, 2023; Yin and others, 2023; Pellegrino and others, 2025). Besides risk mitigation, it represents a significant commercial opportunity for banks: as clients adapt their business models to improve resource efficiency, strengthen supply-chain resilience and respond to changing markets and regulation, they will require financing and advisory support for new technologies, infrastructure and production systems. The opportunity is therefore not limited to financing explicitly labelled 'nature' activities: it extends to financing the underlying business transformation that enables clients to remain competitive and resilient as markets change. By driving innovation and unlocking new areas of economic activity, the circular economy could potentially create more than US$ 10 trillion in business opportunities and 395 million jobs by 2030. Unlocking this potential would require up to US$ 2.7 trillion in annual investment, opening significant lending and investment opportunities for banks (WEF, 2024). It also creates the basis for differentiated financial products—green loans and bonds with circular economy eligibility criteria, sustainability-linked loans with circular key performance indicators (KPIs), blended finance vehicles that help de-risk early-stage circular investments and specialized advisory services for circular transition planning. These offerings can strengthen banks' value propositions by helping clients address concrete business challenges while creating opportunities for differentiated revenue and deeper client relationships. As a growing body of peer-reviewed research has shown, companies adopting circular economy practices can generate higher risk-adjusted returns while also exhibiting a significantly lower probability of default (Bocconi University and others, 2021; Zara and Ramkumar, 2022; Zara and others, 2023). More recent firm-level studies confirm that greater circular economy adoption is associated with higher profitability, stronger market valuation and improved returns on assets and equity (Conca and others, 2026; Teixeira, 2026), consistent with earlier meta-analytic evidence of a significant positive relationship between circular economy practices and firms' financial and ecological performance across 41 studies and 8,610 firms (Yin and others, 2023).

Despite offering compelling environmental and commercial value, circular activities do not automatically translate into bankable lending opportunities. Structural barriers—including limited collateral, small ticket sizes and high upfront development costs—can prevent commercially attractive circular activities from accessing conventional bank finance (Ma and others, 2025), highlighting the importance of blended finance and catalytic capital in bringing such transactions to market (see Box 1). For product-oriented circular models, asset-based and contract-based lending structures can also help address weak collateral quality and cash-flow uncertainty (Toxopeus and others, 2021).

Box 1: Blended finance and other innovative finance solutions

Many circular activities generate clear commercial and environmental returns yet remain hard to finance through conventional lending, as projects may be early stage, lack hard collateral, require small tickets, or carry risks beyond commercial appetite. Blended finance—the use of concessional or catalytic public and philanthropic capital to improve an investment's risk-return profile—together with guarantees and other risk-sharing instruments, is designed to bridge these gaps, reallocating risk so that private capital can participate where it otherwise would not (OECD, 2025c; UNEP FI and others, 2025).

By absorbing first-loss risk, concessional capital "crowds in" commercial investors who would not lend on a standalone basis: blended transactions have on average mobilized around US$ 4 of commercial capital per US$ 1 of concessional finance (Convergence, 2018). Instruments differ in effectiveness—guarantees tend to mobilize private finance more efficiently than debt or equity, and where concessional capital sits in the structure matters more than its volume, with first-loss junior tranches far more catalytic than senior positions (OECD, 2025c). An illustrative example is the Circulate Capital Ocean Fund, which uses blended finance to support plastic recycling and waste management businesses across South and Southeast Asia. A US$ 35 million partial loan guarantee from USAID absorbed first-loss risk, helping mobilize more than US$ 100 million in corporate equity from companies including PepsiCo, Unilever and Dow, alongside subsequent commitments from the International Finance Corporation (IFC) and Proparco (Ocean Conservancy, 2019).

An increasingly important complementary approach is supply-chain finance, particularly as circular transitions require coordinated action across different parts of a value chain—from sourcing to logistics, processing, use and end-of-life management. Rather than financing individual projects or borrowers in isolation, banks can structure financing that brings together buyers, suppliers and other value-chain participants around shared transition objectives. For example, an anchor company may work with suppliers to improve resource efficiency, traceability, circular sourcing or waste recovery, with financing made available across the supplier base and linked to agreed performance criteria. Co-financing by buyers, suppliers, financial institutions and other partners can help share costs and risks, aggregate smaller financing needs and accelerate investment across the value chain, while leveraging established commercial relationships and cash flows to support smaller or less established businesses. This can strengthen the commercial case for circular transition by linking environmental outcomes to procurement, supply security and long-term customer relationships (Patra and others, 2023).

Hence, the absence of a bankable transaction does not necessarily indicate a weak investment opportunity; rather, it may reflect a misalignment between project characteristics and conventional lending requirements or a need for greater coordination among actors across the value chain. This financing challenge is reflected in the broader nature-based solutions (NbS) market: finance for NbS must increase from approximately US$ 220 billion in 2023 to US$ 571 billion annually by 2030 to meet global climate, biodiversity and land-restoration goals, while private finance currently accounts for only around 10% of total investment (UNEP, 2026b). Partnerships with development finance institutions (DFIs), public agencies, philanthropic funders and value-chain partners can help address these barriers and mobilize private capital for circular solutions and business models that protect and restore nature, as discussed in the following chapters.

1.3 Alignment with PRB nature target setting

The Principles for Responsible Banking (PRB) nature target setting approach provides a structured pathway for banks to align their financing activities with the goals of the Kunming-Montreal Global Biodiversity Framework (GBF). The PRB *Guidance on Nature Target Setting* (UNEP FI, 2023), complemented by the discussion paper *Nature Impact Target Setting* (UNEP FI, 2025b), helps move banks from foundational practice targets, which focus on adjusting internal processes and client engagement, toward more ambitious impact targets that aim to achieve measurable improvements in the state of nature across lending, investing and underwriting activities. Figure III presents a high-level approach to PRB target setting in the context of the GBF (UNEP FI, 2023), in line with the overall impact management framework outlined in the UNEP FI *Impact Protocol* for banks (UNEP FI, 2022).

Understand your context, analyze your current practice and performance [PRB Impact Protocol: Impact Identification & Assessment]	**Integrate Nature within bank practices** [PRB Impact protocol: Target-setting—Practice Targets]	**Reduce negative impact and increase positive impact to Nature** [PRB Impact protocol: Target-setting—Impact Targets]
Understand country needs and National Biodiversity Strategies and Action Plans (NBSAPs) to anticipate evolving biodiversity-related regulation	Mainstream Nature within your organization (i.e. policy, client engagement, capacity-building etc..) **(All GBF Targets esp. 1 & 14)**	Stop the loss of areas of high biodiversity importance and protect and restore 30% of Earth's lands, oceans, coastal areas and inland waters **(GBF Target 1 to 4)**
Assess nature-related impact and dependencies of your portfolio to identify priority sectors and clients **(GBF Target 15 & 21)**	Mobilize Nature-related finance (incl. by leveraging climate-nature synergies) and manage portfolio composition **(GBF Goal D and Target 19)**	Reduce additional pressures on biodiversity from human activities from pollution and climate change **(GBF Target 7 & 8)**
Identify and prioritize relevant global biodiversity targets (GBF)	Contribute to relevant national Biodiversity priorities	

Figure 3: High-level approach to PRB target setting in the context of the GBF. Source: UNEP FI (2023)

This guidance supports PRB implementation by showing how the circular economy can help banks identify and address the root causes of nature-related pressures in their portfolios. While the PRB nature target setting framework defines **what** banks need to achieve—measurable reductions in pressures on the state of nature—this guidance helps answer **how**: by showing that circular solutions and production systems inherently reduce the five key pressures that drive biodiversity loss across different ecosystems.

To translate this into practice, the guidance embeds circular economy criteria across the four PRB action areas: policies, processes and culture; portfolio composition and financing; client engagement; and stakeholder engagement and partnerships. This integrated approach enables banks to inform screening and decision-making, shape client strategies and targets in high-impact sectors such as food and agriculture, construction, and textiles, and mobilize capital towards regenerative business models—providing a coherent alignment of their financing activities with the GBF underpinning the PRB nature target setting approach.

1.4 Alignment with global frameworks

As nature-related risks move higher on the global policy and regulatory agenda, banks are facing a rapidly evolving landscape of international commitments, national regulations, taxonomies, due diligence requirements, disclosure standards and supervisory expectations (GARP, 2024; UNEP FI and WWF, 2024). While these initiatives differ in scope and legal status, they increasingly converge around common objectives: halting and reversing biodiversity loss, reducing environmental degradation and strengthening the resilience of economies and ecosystems. This creates both new obligations and growing uncertainty for financial institutions seeking to understand how the various frameworks relate to one another and what they mean in practice. This guidance is designed to help banks navigate this landscape by demonstrating how the circular economy provides a coherent and practical approach that simultaneously addresses obligations and expectations across each of these layers.

The Global Biodiversity Framework (GBF), adopted by 196 countries at COP15 in December 2022, represents the most comprehensive global commitment to halting and reversing biodiversity loss to date (CBD, 2022b). Structured around four overarching goals for 2050 and 23 action targets for 2030, the GBF calls on all actors, including financial institutions, to align their strategies and financial flows with its objectives. By decoupling economic activity from resource extraction, eliminating waste and pollution by design, and regenerating natural capital, circular economy solutions address the root causes of biodiversity loss rather than its symptoms. This makes the circular economy a crucial enabler of GBF implementation across multiple targets simultaneously, including Targets 1–4 (land and sea area conservation and restoration), Target 7 (reduce pollution harmful to biodiversity), Target 10 (sustainable management of agriculture, fisheries and forestry), Target 16 (reducing the global consumption footprint through sustainable consumption and reduced waste), and Target 19 (mobilizing at least US$ 200 billion per year for biodiversity from public and private sources), thereby contributing to Goal D of progressively closing the estimated US$ 700 billion annual biodiversity finance gap (EMF, 2025). National Biodiversity Strategies and Action Plans (NBSAPs) are the primary national instruments through which GBF targets are translated into context-specific action. To date, 119 countries have submitted national targets aligned with the GBF, and 44 have submitted full NBSAPs—though all parties are expected to submit updated plans identifying the financial resources and capacity needed to achieve their national targets (CBD, 2024). Similar to Nationally Determined Contributions (NDCs) in the climate domain, NBSAPs serve as the primary national reference point for setting nature targets that are credible, contextually relevant and aligned with sovereign commitments.

The circular economy is uniquely positioned to support the delivery of the GBF at the scale required. The GBF calls not only for the conservation and restoration of ecosystems, but for a fundamental transformation of the production and consumption systems that drive nature loss—a transformation that the circular economy is specifically designed to achieve. Financing the circular economy transition is not only consistent with GBF alignment but also supports the delivery of other major international agreements, including the Paris Agreement, the Global Plastics Treaty currently under negotiation, and the Global Framework on Chemicals, making it one of the most cross-cutting approaches available to banks seeking to manage nature-related transition risks comprehensively. In addition to these international agreements, a growing number of voluntary or mandatory frameworks and regional regulations establish disclosure, classification, target-setting and due diligence expectations that banks and their clients are increasingly expected—or, for mandatory frameworks, required—to meet. Notable examples include the Taskforce on Nature-related Financial Disclosures (TNFD), Science Based Targets Network (SBTN), and in the European Union (EU), the EU Taxonomy, Corporate Sustainability Reporting Directive (CSRD) and Corporate Sustainability Due Diligence Directive (CSDDD). For more information, see UNEP FI's report *Navigating Nature-Related Regulations for Banks* (2024a).

A practical application of these global frameworks is to translate their targets, metrics, protocols and measurement approaches into financing deals. Rather than developing transaction-level KPIs independently for each deal, banks can increasingly link financing conditions and performance indicators to recognized global goals and their associated metrics and protocols, in a manner comparable to the way climate and Net Zero objectives are increasingly reflected in financing structures. For example, a sustainability-linked financing could incorporate a quantitative, measurable outcome related to water use, pollution reduction, ecosystem restoration or sustainable resource management that is explicitly linked to a relevant GBF target or other recognized global, regional or national nature frameworks. This can improve the credibility and comparability of financing KPIs while creating a clearer connection between individual transactions, client transition plans and broader nature objectives.

1.5 Scope and structure of the guidance

This guidance is structured around three core ecosystem types—(i) ocean and marine, (ii) freshwater and (iii) terrestrial and land. Each of these chapters opens with a concise overview of the key pressures and threats facing that ecosystem, before diving into specific circular interventions identified and refined through an interactive process with a working group of 26 banks. The interventions presented highlight areas where circular economy solutions can deliver measurable improvements in biodiversity and ecosystem health while creating financing opportunities and investable business models for banks. Concrete actions are proposed for banks in alignment with the PRB framework, spanning internal policies, client engagement, financing and partnerships. These actions are illustrated through high-impact sectors most relevant to bank portfolios and supported by case studies (see Annex 1) providing practical examples and sectoral insights.

A critical consideration running through all three ecosystem chapters is the location-specific nature of biodiversity. Unlike climate change, which can be measured through a universal metric—GHG emissions—biodiversity loss is inherently place-based (TNFD, 2023; IPBES, 2019). The same economic activity can have vastly different impacts on nature depending on where it occurs: a circular intervention in a biodiversity hotspot will carry far greater ecological significance than an equivalent intervention in a less sensitive geography. This means that the circular economy solutions and priority areas identified in this guidance may be assessed in light of the specific ecosystems, species and habitats present in a given location—and calibrated against the national biodiversity priorities set out in NBSAPs, the sensitive areas identified through TNFD's LEAP approach, and any applicable national environmental regulations. Banks are therefore encouraged to use this guidance in conjunction with relevant data and tools—such as ENCORE,[1] the WWF Biodiversity Risk Filter,[2] and IBAT[3]—to ensure that circular economy financing decisions reflect the ecological context in which they are being made. An overview of relevant tools to measure biodiversity impacts is provided in Annex 2.

1 ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) supports the assessment of sector-level nature-related dependencies and impacts.

2 The WWF Biodiversity Risk Filter helps identify and assess biodiversity-related risks across locations and supply chains.

3 IBAT provides authoritative biodiversity data on protected areas, Key Biodiversity Areas and threatened species.

This nature-focused guidance represents the second phase in a broader UNEP FI series exploring how the circular economy can help banks meet sustainability commitments across interconnected environmental and socioeconomic challenges. The first phase focused on the circular economy's contribution to climate mitigation, establishing the links between circular finance and GHG emission reductions (UNEP FI, 2025a). A third phase will examine the circular economy's role in advancing healthy and inclusive economies, recognizing that the transition is not only an environmental imperative but also a social and economic one. Examples include reduced resource dependency, supply chain resilience and new financing opportunities in sectors that are currently underserved by conventional economic frameworks.

Ensuring that circular economy strategies deliver aligned benefits across climate, nature and other impact areas, while avoiding unintended risks, is crucial to support informed decision-making and integrated risk management. While many decarbonization solutions, such as solar, wind, hydropower and biofuels, require careful management to minimize potential impacts on nature (IPBES and IPCC, 2021; Finance for Biodiversity Foundation, 2023), well-designed circular economy strategies can often generate co-benefits for both climate mitigation and biodiversity conservation simultaneously. For example, agroforestry can sequester carbon while restoring soil health and biodiversity, and circular water management can reduce energy demand while improving freshwater resilience. Similarly, keeping materials in use for longer through reuse, repair and recycling reduces demand for virgin resource extraction, thereby lowering GHG emissions, reducing pollution and waste, and alleviating pressures on ecosystems (EMF, 2021b). The following chapters outline some of these interlinkages in greater detail. For a more comprehensive analysis, UNEP FI's tools on interlinkages (2024b) provide practical resources that banks can use to identify and manage synergies and trade-offs in practice.

2. Ocean and marine ecosystems

2.1 Impact, risk and opportunity landscape

Ocean ecosystems are under unprecedented pressure. More than 60% of the world's fisheries are now fully exploited (WWF, 2015), coral reefs have declined by more than 50% since 1950 (Eddy and others, 2021), and ocean plastic pollution is expected to outweigh fish mass by 2050 if current trajectories continue (EMF, 2016). Human activity has significantly altered at least 87% of the area of the ocean and is directly linked to the destruction of ocean habitats and marine biodiversity (Luypaert and others, 2020). Beyond the overexploitation of marine life—often through destructive practices such as deep ocean trawling—industries extract vast amounts of other materials from the ocean, from offshore oil, minerals and metals, deep sea phosphate reserves for agricultural inputs, to aquatic organisms used for health and beauty products. The economic value at stake is considerable, with ocean assets valued at US$ 24 trillion, generating at least US$ 2.5 trillion annually in goods and services—equivalent to the world's 7th largest economy (UNEP FI, n.d.-a). Yet only US$ 30 billion have been disbursed to achieve SDG 14 (life below water) since 2010, making it the most underfunded goal (UNCTAD, 2025a).

For banks, these trends translate into material financial exposure. Key sectors, such as fisheries, aquaculture, shipping, coastal tourism, offshore energy and food and beverage companies dependent on marine ingredients, face escalating risks from ecosystem degradation and pollution. For instance, sea level rise and coastal erosion alone could put at risk an estimated US$ 14.2 trillion in coastal real estate assets by 2100, directly affecting mortgage portfolios and collateral values (Kirezci and others, 2020). A sustainable ocean economy, on the other hand, offers strong strategic and financial potential with economic benefits. These are projected to exceed US$ 15 trillion—equivalent to roughly 15% of global GDP (WEF, 2025), offering investment opportunities across multiple sectors such as tourism, shipping, renewable energy, coastal infrastructure, fisheries and aquaculture, as well as emerging high-tech and manufacturing industries which now make up 16% of ocean trade (UNCTAD, 2025b). Marine biotechnology, valued at US$ 4.2 billion in 2023, is expanding with innovations in new antibiotics, biobased materials and low-carbon marine foods (UNCTAD, 2025b). Blue bonds are a rapidly growing asset class, projected to mobilize up to US$ 14 billion of new finance in 2030 and close almost 10% of the estimated annual funding gap for SDG 14, if growth continues at the same rate as seen on the more mature green bond market (Systemiq, 2024).

2.2 Focus areas: Circular solutions in the ocean economy

By eliminating waste and pollution by design, circulating materials at their highest value and regenerating marine and coastal ecosystems, the circular economy offers a holistic approach to address the root causes of ocean degradation across many anthropogenic pressures simultaneously. This chapter presents three circular solution areas which have significant potential to reduce growing nature-related risks while creating new financing and business opportunities through innovative financial products and services, enhanced risk management and new revenue streams.

For each of the following solution areas, the report sets out its alignment with relevant GBF targets, alongside a non-exhaustive overview of positive and negative interlinkages with other environmental, social and economic outcomes, drawing on UNEP FI's *Sector Impact Matrix* (2026a). For each area, the report also outlines key considerations for ensuring that financing delivers genuine, verifiable impact and avoids shifting harm elsewhere in the value chain, together with the main sectors involved and illustrative financing examples.

2.2.1 Circular fishing and aquaculture models

Growing demand for seafood is increasing pressure on both wild fisheries and aquaculture systems. Overfishing remains the single largest driver of marine biodiversity loss, with approximately one third of global fish stocks harvested beyond biologically sustainable levels (FAO, 2025a). According to projections, the seafood industry could face a supply gap of up to 50 million tonnes by 2050 unless production increasingly shifts towards regenerative aquaculture—a transition estimated to require at least US$ 55 billion in capital expenditure (Planet Tracker, 2023). At the same time, tightening regulation on illegal, unreported and unregulated (IUU) fishing, increasing traceability requirements, evolving sustainability standards and growing physical climate risks are reshaping the sector's risk profile (UNEP FI, 2024c).

The circular economy provides complementary pathways to address these challenges by improving the sustainability of capture fisheries while transforming aquaculture into more resource-efficient and resilient production systems. In capture fisheries, circular approaches include science-based fisheries management, selective fishing gear, digital traceability, by-product valorization and improved processing practices that minimize waste, increase resource efficiency and support the sustainable management of fish stocks (OECD, 2025d; FAO, 2023a). In aquaculture, circularity focuses on closing material and nutrient loops through solutions such as recirculating aquaculture systems (RAS), integrated multi-trophic aquaculture (IMTA), nutrient recovery, circular feed ingredients derived from seafood by-products or alternative proteins, and the cultivation of low-trophic species including bivalves and seaweed that can enhance ecosystem functions while producing food (FAO, 2025b; OECD, 2024; Checa and others, 2024). Together, these approaches not only strengthen the long-term resilience of seafood value chains (Osei and others, 2025) but also translate into substantial lending opportunities across vessel finance, aquaculture infrastructure, seafood processing, cold-chain logistics and trade finance for banks.

The transition towards circular and regenerative models may require innovative financing structures where commercial returns alone are insufficient to support early-stage or system-wide improvements. In such cases, blended and concessional finance can help de-risk investments and mobilize commercial capital. The Fisheries Improvement Fund, a concept originally developed by WWF and now designed and managed by Finance Earth, illustrates one such approach. It finances fishery

improvement projects through repayable concessional debt, with repayment generated through small, volume-based fees paid by supply chain actors sourcing from the fishery—typically less than 2% of product cost (UNEP FI and others, 2025). Its first pilot, launched in Chile in 2024, supports improvements in the small pelagic fisheries supplying the salmon feed sector, and the model is now being explored for gear modification, processing infrastructure and decarbonization.

GBF alignment: Target 5 (sustainable, legal and safe harvesting of wild species); Target 10 (sustainable management of fisheries and aquaculture); Target 8 (minimizing climate impacts on biodiversity and building resilience).

Potential interlinkages: **Positive:** Restores fish stock biomass and eases pressure on marine biodiversity and the forage species underpinning food webs, supporting food security and the physical health, livelihoods and cultural heritage of coastal fishing communities; low-trophic and regenerative aquaculture (bivalves, seaweed) additionally improves water quality and contributes to climate stability through carbon sequestration, with co-benefits for employment and SME development. **Negative:** Expanding seafood supply can trade off against animal welfare, water quality and use, and biodiversity where production intensifies; regenerative aquaculture can shift pressure from marine to terrestrial ecosystems through feed substitution and habitat conversion; certification and traceability standards risk disadvantaging smaller fisheries; and processing and vessel operations carry occupational health and decent work exposure.

Key considerations: Independently verified certification and traceability are critical to financing credibility, although certification costs may disadvantage smaller fisheries, potentially requiring blended or concessional finance to overcome these barriers (UNEP FI and others, 2025). Given that material impacts may arise upstream in feed and input supply chains, due diligence and covenants may consider relevant sourcing practices in addition to the borrower's own activities.

Examples of high-impact sectors and financing opportunities:

- **Marine fishing (ISIC A0311/NACE A03.11[4]):** Selective fishing gear and gear upgrades that reduce bycatch and discards; improved onboard handling and storage that reduce catch losses and waste; and technologies that improve resource efficiency and utilization of catches.
- **Marine aquaculture (ISIC A0321/NACE A03.21)**: Recirculating aquaculture systems (RAS), integrated multi-trophic aquaculture (IMTA), and ecosystem-enhancing seaweed and shellfish production where these support resource recovery, water recirculation, and reduced reliance on external inputs or other circular production practices.
- **Fish and seafood processing (ISIC C1020/NACE C10.20)**: Resource-efficient processing, water reuse and recycling, by-product and waste valorization, and cold-chain systems that reduce product loss and waste.
- **Wholesale of fish and seafood (ISIC G4630/NACE G46.38)**: Supply-chain and working-capital finance linked to traceability, sustainable sourcing and circular procurement requirements, supporting the uptake of responsible practices across seafood supply chains.

4 ISIC and NACE section letters are provided alongside class codes for ease of reference.

2.2.2 Plastic alternatives and marine waste recovery

Plastic pollution is a systemic externality embedded across nearly every consumer goods supply chain financed by banks—from packaging of fast-moving consumer goods to single-use items distributed through retail, hospitality and food service. Approximately 11 million tonnes of plastic enter the ocean each year, a figure projected to triple by 2040 without system-level intervention (Systemiq, 2023). Plastic-intensive packaging and consumer goods companies face growing regulatory, reputational and market risk as negotiations on the Global Plastics Treaty advance and governments introduce increasingly stringent regulations on single-use plastics, packaging and recycled content. Without proper actions along the value chain, the total cost to governments of managing plastic waste by 2040 may reach US$ 670 billion, with an estimated US$ 100 billion annual financial risk—making the cost of inaction particularly high for businesses (World Bank Group, n.d.).

Banks that proactively support clients toward circular alternatives are better positioned to manage transition risks from emerging regulations and shifting consumer preferences, while accessing growing demand for circular economy financing. A US$ 10.8 billion market for marine-based plastic substitutes is currently taking shape, offering economic gains alongside environmental benefits (Formenti and Pacini, 2024). Ocean plastic recovery operations—ranging from river interceptors to open-sea collection platforms—are generating novel revenue models including credit schemes and recycled feedstock supply chains (Baron and others, 2021).

GBF alignment: Target 7 (reduce pollution risks, including from plastics, to levels not harmful to biodiversity); Target 16 (reduce the global consumption footprint and waste).

Potential interlinkages: **Positive:** Reduces pollution loads on marine, freshwater and soil systems, easing pressure on biodiversity and species exposed to plastic ingestion and entanglement; improves air quality and climate stability by cutting life cycle emissions from plastic production and disposal, creates co-benefits for human health due to reduced contamination (microplastics specifically); and supports employment and SME development in the coastal and lower-income communities where plastic pollution is most acute. **Negative:** Energy recovery from waste can trade off against climate stability and air quality; poorly managed collection and treatment can degrade land, soil and water and expose workers to occupational health risks; bio-based substitution can shift pressure onto land and fresh water; and tightened standards risk excluding SMEs and informal waste workers.

Key considerations: Prioritizing upstream solutions, including circular design and regenerative sourcing, alongside reuse, cascading use and effective end-of-life recovery helps ensure genuine material circularity rather than simple material substitution (EMF, 2026).

Examples of high-impact sectors and financing opportunities:

- **Plastic materials, resins and products manufacturing (ISIC C2013; C2220/NACE C20.16; C22.22; C22.29)**: Recycled-content materials, recyclable and reusable packaging, alternative materials and production systems that reduce reliance on virgin plastics and enable material recovery.
- **Fast-moving consumer goods (ISIC C10–C32/NACE C10–C32; various manufacturing subsectors):** Reusable and recyclable packaging systems, packaging redesign, recycled-content inputs and business models that reduce single-use plastic use across consumer goods value chains.
- **Textiles and apparel manufacturing (ISIC C1310–C1430/NACE C13.10–C14.39):** Fiber-to-fiber recycling, recycled synthetic fibers, textile collection and sorting systems, and production processes that reduce microfiber shedding.
- **Waste collection and treatment (ISIC E3810–E3830/NACE E38.11; E38.21; E38.32):** Plastic collection, sorting, recycling and material recovery infrastructure that diverts plastic waste from disposal and reduces leakage into aquatic environments.
- **Marine and river plastic recovery (ISIC E3900/NACE E39.00):** Systems that collect and recover plastic from rivers, coastlines and marine environments, including sorting and processing infrastructure that enables recovered material to re-enter productive use.

2.2.3 Regenerative ocean resource management

Marine ecosystems—including mangroves, seagrasses, kelp forests and coral reefs—underpin economic activity by providing critical ecosystem services, including carbon sequestration, nutrient cycling, water filtration, coastal protection and fisheries support. Together, these services generate at least US$ 2.5 trillion in annual economic value and are supported by an estimated natural asset base of US$ 24 trillion (WWF, 2015). Yet these ecosystems are being degraded at accelerating rates: up to 50% of coral reefs have been lost (NOAA, 2026), mangrove cover has declined by 20–35% in recent decades, and seagrass meadows are disappearing at approximately 7% per year globally (UNEP, 2026a). The resulting erosion of ecosystem services not only heightens physical risks from storms and sea level rise but also undermines the long-term viability of coastal industries within banks' lending portfolios (UNEP FI, 2021a).

Regenerative ocean management practices, including the restoration of mangroves, seagrass meadows and coral reefs, can reduce nature-related and physical risks across banks' portfolios while expanding financing opportunities in nature-based coastal infrastructure, regenerative fisheries and aquaculture, and green, blue and sustainability-linked finance (UNEP FI, 2021b). These opportunities extend beyond ecosystem restoration to include nature-based coastal infrastructure, regenerative fisheries and aquaculture, blue carbon projects, sustainable coastal tourism, and businesses providing technologies and services that support ecosystem restoration, monitoring and resilience (UNEP FI, 2021a). Where projects generate predictable cash flows, they may be financed through conventional lending, while activities with longer investment horizons or less mature business models may require blended or concessional finance to improve bankability by absorbing early-stage risks, supporting project preparation and crowding in private capital (UNEP FI and others, 2025). An expanding suite of financing mechanisms—including payments for ecosystem services (PES), user fees, blue bonds and debt-for-nature swaps—is demonstrating how public and private capital can be combined to finance marine conservation and restoration at scale (UNEP FI and others, 2025). These approaches are

directly aligned with the GBF, particularly its 30-by-30 target (Target 3)[5] (CBD, n.d.). For ecosystems in areas beyond national jurisdiction, they also align with the BBNJ Agreement (High Seas Treaty), which entered into force in January 2026 as the first legally binding framework for establishing marine protected areas across the high seas (UN, 2023).

GBF alignment: Target 2 (restoration of degraded ecosystems); Target 3 (30-by-30 conservation); Target 8 (climate mitigation and adaptation through NbS); Target 11 (maintenance and restoration of regulating ecosystem services, including protection from hazards).

Potential interlinkages: **Positive:** Restores biodiversity and the coastal ecosystems—mangroves, seagrasses, reefs—that underpin fisheries, food security and physical health; contributes to climate stability through blue carbon sequestration (mangroves can store up to five times more carbon per unit area than tropical forests (Chatting and others, 2022)); improves water quality through natural filtration; and strengthens climate adaptation and disaster risk preparedness by rebuilding natural coastal protection, with co-benefits for coastal livelihoods. **Negative:** Blue carbon revenues depend on permanence and additionality that can be hard to secure; if not properly managed, restoration may shift pressure onto other ecosystems where feed, materials, or land inputs are poorly sourced; and where restoration is not inclusive, it can affect access to resources and livelihoods of coastal communities dependent on those areas.

Key considerations: Blue carbon and restoration finance require robust permanence, additionality and cost-effective Monitoring, Reporting and Verification (MRV), as weak attribution of outcomes can undermine impact claims and sustainability-linked instruments. Assessing impacts on coastal communities is essential, with outcomes hinging on local livelihoods, inclusive participation and, where relevant, Free, Prior and Informed Consent (FPIC). Restoration does not inherently require long investment horizons: while some activities take years to generate revenues or measurable outcomes, others can deliver ecological improvements more quickly. Banks may therefore assess each intervention based on its ecological recovery trajectory, cash-flow profile and evidence base. Conventional financing may suit projects with predictable cash flows and credible outcomes, while blended or concessional finance—including first-loss capital and, in some cases, debt-for-nature swaps—can help address higher development, outcome or collateral risks. Mechanisms such as PES and durable governance can further strengthen project viability.

5 Target 3 calls for the protection and effective management of at least 30% of the world's terrestrial and marine areas by 2030.

Examples of high-impact sectors and financing opportunities:

- **Marine fishing (ISIC A0311/NACE A03.11):** Ecosystem-based fisheries management, stock-rebuilding programmes, habitat restoration linked to fishing grounds and measures that support recovery of degraded or overexploited fish stocks.
- **Marine aquaculture (ISIC A0321/NACE A03.21):** Ecosystem-enhancing aquaculture, including integrated multi-trophic aquaculture (IMTA) and seaweed or shellfish production where these contribute to habitat enhancement, water-quality improvement, nutrient cycling, or other ecosystem functions.
- **Hotels and similar accommodation (ISIC I5510/NACE I55.10):** Mangrove, seagrass and coral reef restoration, nature-based coastal protection and ecosystem-sensitive development associated with coastal tourism assets.
- **Remediation activities and other waste management services (ISIC E3900/NACE E39.00):** Marine and coastal pollution remediation, including removal of oil and other pollutants and clean-up of contaminated coastal and marine environments, as well as activities supporting the recovery of degraded marine areas.

2.3 Practical implementation across PRB action categories

The tables in this section outline non-exhaustive actions banks can take to integrate circular ocean economy solutions across the four PRB action categories—policies, processes and culture; client engagement; portfolio composition and financing; and stakeholder engagement and partnerships—and thereby support the implementation of their nature strategies and targets. For each category, a table presents specific actions banks can take and the expected impact on marine ecosystems at the client level. It also indicates the primary circular business model category supported, in line with the European Commission *Categorisation System for the Circular Economy* (2020). Actions may be adapted to each bank's portfolio composition, geographic footprint and institutional capacity.

2.3.1 Policies, processes and culture

Banks can integrate ocean and marine ecosystem risk criteria (e.g. exposure to IUU fishing, reliance on at-risk fish stocks, plastic packaging intensity and coastal asset concentration) into their core governance structures and internal processes, including standard risk assessment, know your customer (KYC) and environmental and social due diligence frameworks. Banks can also embed ocean-related considerations into sectoral policies, strengthen data collection and management to capture marine and coastal exposures, conduct portfolio impact analysis to understand their footprint and dependence on ocean ecosystems, and equip staff with the knowledge needed to identify, assess and manage ocean-related risks and opportunities associated with the transition towards more circular solutions and business models. An overview of potential actions banks can take is provided in Table 1.

Relevant tools and frameworks include TNFD's LEAP approach, coupled with its ocean-specific guidelines and action frameworks, including sector guidance for fishing and marine transportation and cruise lines, each of which contains ocean-specific metrics (TNFD, 2025). UNEP FI *Sustainable Blue Economy Finance Principles* (UNEP FI, n.d.-b) and *Ocean Investment Protocol* (UNEP FI, 2025c) provide banks with practical guidance on managing environmental risks in ocean-linked lending and investment decisions.

Table 1: Actions to integrate circular ocean solutions into policy, processes and culture, and expected impact (non-exhaustive)

- Circular fishing and aquaculture models
- Plastic alternatives and marine waste recovery
- Regenerative ocean resource management
- Across all three

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Due diligence, risk assessment and other internal processes		
Integrate marine and coastal ecosystem dependencies, impacts and risks into environmental and social due diligence, KYC and relevant credit-risk assessments, considering location- and sector-specific factors such as dependence on marine resources, plastic and other marine pollution, habitat degradation and regulatory exposure.	Strengthens identification of financially material ocean-related risks and dependencies and supports more consistent risk-based lending and client assessment.	Across value chain
For relevant fishing and aquaculture exposures, incorporate criteria covering stock status, fishing practices, traceability, aquaculture systems and interactions with sensitive marine ecosystems into due diligence and credit assessment.	Improves assessment of resource-depletion and ecosystem-related risks and helps distinguish more resilient and circular production models from activities with unmanaged environmental risks.	Circular design and production; circular use
For relevant plastic-intensive and waste-management exposures, assess exposure to plastic leakage, waste-management gaps and regulatory developments affecting plastics, alongside the credibility of proposed plastic reduction, substitution and recovery measures.	Helps identify material pollution and transition risks and supports more informed assessment of opportunities associated with circular materials and marine waste recovery.	Circular value recovery
Sectoral policies and other internal processes		
Integrate ocean biodiversity criteria into sectoral policies and internal processes, including lending, client engagement and decision-making, with clear governance, accountability and criteria for managing exposure to high-impact activities and critical marine habitats.	Encourages clients in high-impact sectors to identify and manage marine biodiversity risks and improve practices, supporting reduced pressures on marine ecosystems and species.	Across value chain

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Data collection and management		
Implement systems to collect and analyse clients' ocean performance data and integrate ocean dependency and impact mapping, using tools such as ENCORE and TNFD LEAP, into environmental assessments for high-impact sectors (e.g. for fisheries, aquaculture, coastal tourism, shipping, consumer goods and infrastructure clients).	Enables baseline assessment and ongoing monitoring of the portfolio's contribution to marine ecosystem health; identifies hotspots of biodiversity risk and circularity opportunity to inform targeted engagement and financing.	Across value chain
Portfolio impact analysis		
Assess portfolio exposure to ocean-related dependencies, impacts and risks by mapping exposure across ocean sub-sectors, client types and marine contexts, and applying biodiversity footprinting and nature-related scenario analysis to identify priority clients, geographies and risks.	Enables banks to identify, quantify, and prioritize clients and activities with the greatest potential impacts and dependencies on marine ecosystems, supporting more targeted risk management and engagement.	Across value chain
Capacity building and training		
Develop training for board members, employees and relationship managers on ocean dependencies and marine biodiversity risk, circular ocean business models and relevant certification and measurement frameworks (e.g. MSC, ASC, TNFD, blue carbon standards).	Builds the institutional knowledge and frontline fluency needed to identify, assess and support circular transitions; reduces the risk of financing harmful practices; improves due diligence and engagement quality.	Across value chain

2.3.2 Client engagement

Effective client engagement can help banks identify financing opportunities, strengthen client relationships and manage marine biodiversity risks. By working with clients to understand their dependencies and impacts, banks can support credible transition pathways and identify opportunities associated with circular business models.

The greatest opportunity to influence client transition often arises when a client is already seeking capital to change or expand its operations. At this point, banks can bring together their sector knowledge, market intelligence and understanding of the client's business model with relevant global nature goals to shape the financing approach. This may include directing capital towards circular business models, incorporating relevant KPIs into financing structures, or adjusting financing terms to support outcomes aligned with recognized global objectives. In this way, client engagement becomes closely connected to the commercial financing relationship, helping clients adapt their businesses while enabling banks to manage risk, support stronger loan book performance and contribute to outcomes that reduce pressure on ecosystems and natural resources.

The focus of engagement will vary across sectors, reflecting differences in business models, dependencies and environmental pressures. Table 2 provides illustrative actions across the client engagement cycle, from initial dialogue and assessment through to support, financing and monitoring. For further details, see *Guidance on Client Engagement* by UNEP FI (2024e).

Table 2: Actions to integrate circular ocean solutions into client engagement, and expected impact (non-exhaustive)

Circular fishing and aquaculture models
Plastic alternatives and marine waste recovery
Regenerative ocean resource management
Across all three

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Scene setting and opening dialogue		
Open dialogue with fisheries and aquaculture clients on their dependence on healthy marine ecosystems, including fish stock health, water quality and habitat availability, and opportunities to improve resource efficiency, reduce pollution and waste, and strengthen circular resource management.	Builds awareness of ecosystem dependencies and creates a basis for clients to identify practices that reduce pressures on fish stocks, habitats and marine resources.	Across value chain
Engage consumer goods, retail, textile, hospitality and other relevant clients on exposure to ocean-bound plastic, evolving regulation (e.g. single-use plastic restrictions, extended producer responsibility (EPR) schemes, plastic taxes and packaging requirements) and opportunities for reusable, biodegradable, recyclable and other circular packaging solutions.	Encourages clients to identify and manage plastic-related risks and consider measures to reduce plastic use and leakage into marine environments.	Across value chain
Needs assessment and awareness raising		
Assess clients' marine biodiversity dependencies, impacts, existing practices and transition readiness, using sector-relevant indicators such as fish-stock dependence, plastic intensity, habitat exposure, resource use and waste management.	Provides a tailored baseline of each client's marine footprint and transition readiness; enables engagement calibrated to the client's specific ecosystem impact profile and capacity.	Across value chain
Identify barriers to adopting circular solutions, including technology, data, capacity, certification, infrastructure and financing needs, and agree priorities with clients, while highlighting market access and price-premium benefits.	Clients identify and address key barriers to adopting circular solutions, improving investment readiness, access to markets and potential price premiums while accelerating implementation.	Across value chain

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Raise awareness among fisheries, aquaculture, coastal tourism and infrastructure clients of their dependence on healthy coral reefs, mangroves and seagrasses for coastal protection, biodiversity richness and water quality, and present the case and financing options for regenerative coastal development and habitat restoration.	Reframes marine ecosystems from passive backdrop to material business asset; creates appetite for investment in regenerative and nature-based approaches that underpin long-term asset value and operational resilience of coastal habitats.	Across value chain
Defining support plans		
Develop time-bound client transition plans with relevant targets, milestones and data requirements for adopting circular ocean solutions, proportionate to the client's size, sector and transition readiness.	Creates a structured pathway for clients to implement and track practices that reduce pressures on marine ecosystems and improve resource management.	Across value chain
Where relevant, support clients in pursuing recognized certifications and credible standards for responsible fisheries, aquaculture, sourcing and traceability (e.g. MSC, ASC, GlobalG.A.P. Aquaculture), while ensuring that certification requirements remain proportionate and do not create barriers to market access for smaller operators.	Supports adoption of independently verified practices that improve resource management, traceability, bycatch management and habitat protection without excluding smaller producers, Indigenous Peoples and local communities.	Across value chain
Designing and offering products and services to implement support plans		
Develop financing solutions (e.g. sustainability-linked loans, blue or green bonds with ocean use-of-proceeds) linked to measurable circular outcomes, such as reductions in bycatch or plastic use, increased use of circular inputs, improved traceability or adoption of ecosystem-enhancing practices.	Reduced resource use, waste and marine ecosystem impacts across clients' operations and supply chains, alongside increased uptake of circular inputs, traceability and ecosystem-enhancing practices.	Across value chain
Provide technical assistance, capacity building and catalytic finance where lack of expertise, upfront costs or project scale limits adoption of circular ocean solutions.	Helps clients overcome barriers to implementing circular practices and enables wider adoption of solutions that reduce marine pollution, resource depletion or habitat pressures.	Across value chain

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Offer supply-chain and working-capital finance that incentivizes downstream clients to source from suppliers meeting defined circularity, traceability or marine-impact criteria.	Extends circular practices across supply chains by leveraging downstream purchasing power to improve resource use, traceability and marine impact management across marine-ingredient and packaging supply chains.	Across value chain
Monitoring		
Monitor agreed client KPIs and milestones, using sector-relevant indicators such as bycatch, certified sourcing, plastic reduction, circular input use, fertilizers and chemicals replaced, ballast or greywater treated, habitat restoration or waste recovery.	Provides evidence of changes in client practices and progress in reducing pressures on marine ecosystems, enabling corrective action where progress is limited.	Across value chain
Review client progress periodically and adjust engagement, support and financing conditions where agreed milestones are not met.	Strengthens accountability for continued improvement in practices that affect marine ecosystems and resources.	Across value chain

2.3.3 Portfolio composition and financing

Banks are invited to progressively increase their financing of activities and business models that contribute positively to ocean health and circular resource use, while strengthening the management of environmental risks and transition opportunities across their portfolios.

A range of financial instruments can support this transition, depending on the nature and maturity of the underlying activity. Blue bonds and other use-of-proceeds instruments can finance defined circular activities, such as sustainable fisheries and aquaculture, plastic prevention and recovery, and regenerative marine resource management. Sustainability-linked loans can link financing terms to measurable ocean and circularity KPIs,[6] while blended finance structures can combine concessional and commercial capital to address the higher risks, upfront costs or limited track record of emerging circular ocean solutions. Supply-chain and working-capital finance can support the adoption of circular practices across value chains by incentivizing seafood suppliers to improve traceability and meet recognized sustainability standards, or downstream buyers to reduce plastic use and increase circular packaging. Large retailers and fast-moving consumer goods companies with significant exposure to marine ingredients or plastic packaging are therefore relevant engagement and financing targets, as banks can leverage existing relationships with these buyers to support wider supply-chain shifts through sustainability-linked working capital and other financing linked to circular sourcing and packaging targets.

6 Examples of indicators include weight or volume and percentage of fertilizers/plastics replaced (tons/year; %); capacity for plastic recycling (weight or volume) (tons/year); percentage of ballast water treatment (%/year); percentage of ocean and water-friendly products against other products (%); volume of ballast water, black water, greywater or bilge water treated (m^3/year). For more, see IFC *Guidance for Blue Finance* (IFC, 2025).

The design of these instruments can draw on established blue-finance market guidance, notably the International Capital Market Association (ICMA) *Bonds to Finance the Sustainable Blue Economy* (2023) and the IFC *Guidelines for Blue Finance, Version 2.0* (2025). These frameworks provide eligible blue project categories and example impact indicators, which banks can complement with circularity-specific criteria and KPIs to ensure that financing supports both circular resource use and improved management of marine impacts. An overview of potential actions banks can take to channel capital towards more circular activities and business models in the ocean economy is provided in Table 3 below.

Table 3: Actions to integrate circular ocean solutions into portfolio composition and financing, and expected impact (non-exhaustive)

Circular fishing and aquaculture models
Plastic alternatives and marine waste recovery
Regenerative ocean resource management
Across all three

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Increasing circular financing with positive impact		
Increase financing for circular aquaculture systems—including integrated multi-trophic aquaculture (IMTA), recirculating aquaculture systems and ecosystem-enhancing production of seaweed and shellfish—where these improve resource efficiency and reduce environmental pressures.	Reduces pressure on wild fish stocks by lowering reliance on conventional feed; closes nutrient loops through the use of circular nutrient inputs; improves water quality by reducing excess nutrients and eutrophication.	Across value chain
Increase financing of selective fishing gear upgrades (e.g. escape panels, modified mesh, turtle-exclusion devices), digital catch monitoring and vessel efficiency improvements that reduce ecosystem disturbance and bycatch.	Directly reduces mortality of non-target species (e.g. sharks, rays, juvenile fish, sea turtles, seabirds); minimizes seabed disturbance; improves the data underpinning ecosystem-based fisheries management.	Circular use; circular support
Increase financing for reusable, recyclable and other circular packaging solutions that reduce reliance on virgin and single-use plastics, particularly in consumer goods, retail and food service.	Prevents plastic leakage into marine environments; reduces persistent pollution and microplastic formation; lowers reliance on fossil-derived packaging, while creating new markets and revenue streams for alternative, recycled and bio-based packaging materials.	Circular design and production; circular value recovery
Increase financing for systems that collect, sort and recover marine and riverine plastic waste, including infrastructure that enables recovered material to re-enter productive use.	Removes plastic pollution from marine ecosystems, reducing ingestion and entanglement mortality; prevents fragmentation of macroplastics into microplastics; creates circular material value from recovered ocean plastics.	Circular value recovery

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Increase financing for coastal and marine ecosystem restoration, including mangrove, seagrass and coral reef restoration, where projects support ecosystem resilience and sustainable coastal livelihoods.	Supports restoration of degraded marine and coastal habitats and recovery of associated ecosystem functions, including increased fish productivity, carbon sequestration, and natural coastal protection, while generating economic value for fisheries- and tourism-dependent communities.	Across value chain
Increase financing for circular food production and processing solutions by using sustainably sourced marine ingredients, upcycled seafood by-products, and low-impact alternative proteins (seaweed-, insect-, algae-based) that reduce the footprint of marine ingredient supply chains.	Reduces the extraction pressure embedded in food supply chains; promotes a circular food economy that maximizes value from marine resources while minimizing waste, pollution, bycatch and habitat disruption.	Circular design and production
Increase financing for enabling infrastructure, technologies and platforms that support circular ocean activities, including traceability, monitoring, verification, waste recovery and resource-efficient production systems.	Enables wider adoption and scaling of circular ocean solutions by reducing infrastructure, data and technology barriers.	Circular support
Decreasing financing with negative impact		
Apply enhanced due diligence and risk management criteria to activities associated with significant pressures on marine ecosystems, with financing decisions informed by the client's environmental performance and transition plans.	Encourages clients with significant marine impacts to strengthen environmental practices and transition away from harmful activities that lead to overexploitation, marine habitat destruction and pollution.	Across value chain

2.3.4 Stakeholder engagement and partnerships

Collective action is essential to address ocean ecosystem challenges and accelerate the transition to a sustainable and circular ocean economy. By collaborating with governments, DFIs, industry initiatives, research institutions and NGOs, banks can help shape enabling policies, mobilize blended finance and risk-sharing mechanisms and strengthen the technical capacity needed to finance circular business models across ocean-dependent sectors, with concrete actions provided in Table 4 below.

Table 4: Actions to integrate circular ocean solutions into stakeholder engagement and partnerships, and expected impact (non-exhaustive)

- Circular fishing and aquaculture models
- Plastic alternatives and marine waste recovery
- Regenerative ocean resource management
- Across all three

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Engaging with policymakers		
Engage policymakers and standard-setting bodies to advocate for regulatory and disclosure frameworks that support the circular ocean economy—science-based fisheries management, marine protected area governance, and nature-related disclosure standards (e.g. TNFD sector guidance for fisheries, aquaculture and maritime industries).	Builds the policy infrastructure circular ocean business models need; advances standardization of nature-related risk assessment and impact measurement, so better data drives better financing decisions across the sector.	Across value chain
Partnering with other financial institutions, including development finance institutions		
Partner with development finance institutions to co-develop blended finance platforms for blue economy investment in emerging markets—sustainable aquaculture, marine restoration and plastic recovery—where commercial risk would otherwise preclude private participation.	Extends circular ocean financing into regions where marine biodiversity loss is most acute and local financial capacity most limited; blended structures de-risk first-mover investment and catalyse private capital.	Across value chain
Engage other commercial banks through platforms to share best practice on ocean risk assessment and develop common methodologies for measuring marine biodiversity impact.	Promotes sector-wide consistency in ocean risk assessment and impact measurement; shared standards reduce greenwashing risk and improve the sector's collective capacity to deliver measurable ocean benefit.	Across value chain
Collaborate with insurers and pension funds to develop and scale marine risk-transfer instruments that create new incentives for marine ecosystem protection and restoration.	Unlocks additional private capital for marine conservation by providing risk-mitigation instruments that make investments viable; reef insurance creates direct financial value for intact coral ecosystems.	Across value chain

Actions to integrate circular ocean solutions into nature strategies and targets (bank level)	Impact on marine ecosystems (client level)	Circular business model category
Engaging with industry initiatives, civil society and academia		
Engage industry initiatives, NGOs, research institutions and multi-stakeholder platforms to strengthen the bank's understanding of circular ocean solutions, promote credible standards and certification, and share knowledge across relevant sectors and value chains.	Supports wider adoption of credible practices for resource management, traceability, pollution reduction and habitat protection across relevant sectors.	Across value chain
Participate in international ocean governance and finance platforms, including the High Level Panel for a Sustainable Ocean Economy, Global Ocean Alliance and UNEP FI Sustainable Blue Economy Finance Initiative, to contribute financial-sector perspectives to policy, standards and market development.	Supports enabling policy and market conditions that facilitate investment in circular activities and improved management of marine ecosystem impacts.	Across value chain

3. Freshwater ecosystems

3.1 Impact, risk and opportunity landscape

Freshwater ecosystems provide indispensable ecosystem services, including water for agriculture, manufacturing, data centre cooling, energy production and urban life. Despite their importance to society and the economy, they remain among the most stressed and degraded ecosystems globally with freshwater biodiversity declining by an average of 84% since 1970—significantly exceeding that of terrestrial or marine species (WWF, 2022). Approximately 4 billion people face severe water scarcity for at least one month per year (UN, 2026), and the WRI Aqueduct Water Risk Atlas identifies numerous high-growth emerging markets as facing extreme water stress conditions by 2030 (WRI, 2023a). Global groundwater reserves, which supply approximately 40% of irrigated agriculture worldwide, are being depleted at rates far exceeding natural recharge in many of the world's most productive agricultural basins (CGIAR, 2017). Economic losses attributable to water insecurity are substantial, amounting to approximately US$ 260 billion annually due to inadequate water supply and sanitation, US$ 120 billion per year from urban property flood damage and US$ 94 billion annually in agricultural irrigation losses (OECD, 2022).

As degradation of freshwater sources accelerates, so do risks to businesses and banks. Water-intensive sectors such as agriculture, food and beverage, textiles, semiconductors, mining, and power generation, which make up significant portions of commercial bank portfolios, face potential financial impacts of US$ 301 billion—more than five times the cost of addressing those risks (CDP, 2021). Agriculture, which accounts for roughly 70% of global freshwater withdrawals, is particularly exposed: declining aquifers, reduced snowpack and shifting allocation regimes are reducing productivity and, in some regions, rendering irrigated land economically unviable (Madani, 2026). Industrial users, including thermal power plants, data centres, and manufacturing facilities, face similar vulnerabilities, as drought conditions and tightening regulations constrain access to reliable water supplies (WEF, 2026b). Deteriorating water quality is compounding these risks: Agricultural run-off containing synthetic fertilizers and pesticides, industrial wastewater discharge and insufficiently treated urban sewage are driving widespread ecosystem degradation, with nutrient pollution causing eutrophication and harmful algal blooms across rivers and lakes in heavily farmed regions (Anderson, Glibert and Burkholder, 2002).

These pressures are increasingly recognized as a direct source of credit risk: institutions with concentrated exposure to water-stressed sectors face higher non-performing loans and deteriorating asset quality, drought-driven yield losses raise agricultural default probabilities, and water pollution and scarcity erode the value of land and assets pledged as collateral (OECD, 2025a). CDP estimates that US$ 15 billion of assets are already stranded or at risk in the energy and mining sectors alone as a result of water issues, yet only around a third of financial institutions currently conduct water-related risk assessments (CDP, 2022). According to Moody's Ratings, water management is a material credit consideration for roughly one-third of rated sovereigns, and two issuers facing identical water pressure can follow very different credit trajectories depending on infrastructure readiness, governance and financial flexibility (Novo, 2026). The De Nederlandsche Bank assessment of the Dutch financial sector's dependence on ecosystem services identified groundwater and surface water among the

most significant nature-related dependencies in its holdings (DNB and PBL, 2020). Besides physical risks, regulatory pressure is intensifying, with water pricing reform, stricter water quality standards, expanding nature- and water-related disclosure expectations (e.g. TNFD and CSRD) and increasing constraints on water withdrawals across key markets (OECD, 2025a).

Investments in water efficiency, reuse, pollution reduction and ecosystem restoration do more than mitigate the transition and physical risks through which water scarcity, flooding and water quality degradation cascade from operational disruption to economic pressure and, ultimately, credit stress (Moody's Ratings, 2025). They open new commercial and market opportunities for banks, with global financing needs for water infrastructure projected to range from US$ 6.7 trillion by 2030 to US$ 22.6 trillion by 2050 (OECD, 2018). Beyond financing water-related technologies and infrastructure and the growing market for green and sustainability-linked instruments, opportunities lie in the delivery structures that make these investments bankable, particularly where public offtakers are less creditworthy or freshwater remains underpriced: public-private partnership models such as design-build-operate (DBO) and hybrid annuity models (HAM), joint-venture structures, tradeable wastewater reuse certificates and de-risking tools such as partial credit and payment guarantees (Khemka and Eberhard, 2025). Further detail on these and other financeable models is provided in Section 3.3.3 on portfolio composition and financing.

3.2 Focus areas: Circular solutions in freshwater ecosystems

By reducing water waste and pollution, keeping water and materials in productive use and supporting the regeneration of freshwater ecosystems, the circular economy offers a holistic approach to addressing the drivers of freshwater degradation. This chapter presents three circular solution areas with significant potential to reduce nature-related risks while creating financing and business opportunities through new financial products and services, enhanced risk management and new revenue streams across industrial, urban and agricultural water use.

Circular water solutions can generate co-benefits well beyond water quantity savings, including improved freshwater ecosystem health, climate resilience, food security, human health and social equity, while generating distinct risk reduction and market opportunity benefits for banks. Understanding these interlinkages enables more sophisticated client engagement, multi-impact financial product design and alignment with the growing range of sustainability frameworks and disclosure expectations that require banks to assess nature-related impacts and dependencies holistically. Applying tools such as life cycle assessments (LCA), alongside basin-level and ecosystem impact analyses, helps identify and mitigate trade-offs related to water quality, energy use, pollution and downstream impacts. Circular water interventions in water-scarce basins may be designed in genuine consultation with downstream users and ecosystems, respecting the rights of smallholder farmers, indigenous communities, women and other marginalized or vulnerable groups, as well as rural populations whose livelihoods depend on healthy freshwater systems.

3.2.1 Industrial water reuse

Industry accounts for approximately 20% of global freshwater withdrawals (FAO, n.d.) and is responsible for a significant share of water quality degradation through discharge of chemical, thermal and nutrient pollutants. Water-intensive manufacturing sectors, including textiles, food and beverage, chemicals, semiconductors, paper and pulp, and mining, are among the most exposed to both physical water risk and regulatory tightening on discharge standards (WRI, 2023b). Closed-loop industrial water systems, advanced wastewater treatment and on-site water recycling can significantly reduce net freshwater consumption in well-engineered facilities and avoid contaminated discharge to receiving water bodies.

Financing the transition to circular industrial water systems can therefore be both a risk mitigation strategy and a commercially attractive proposition, as clients reduce operating costs (water purchasing, effluent treatment, regulatory compliance) while improving resilience and reputational standing (OECD, 2025b; UNESCO, 2017). The market opportunity is significant: scaling potable and industrial water reuse from 3% currently to 25% of municipal freshwater withdrawals will require US$ 170–340 billion in investment over 15 years, representing an eightfold increase in highly purified water treatment capacity and 14% annual growth in reuse infrastructure through 2040 (Khemka and Eberhard, 2025). Examples of delivery and financing structures that can unlock this pipeline—concessions, hybrid annuity models, guarantees and reuse-certificate markets—are set out in Chapter 3.3.3, Portfolio composition and financing.

GBF alignment: Target 7 (reduce pollution risks, including from excess nutrients and hazardous chemicals, to levels not harmful to biodiversity); Target 11 (maintenance and restoration of regulating services, including water quality and flow regulation); Target 16 (reduce the global consumption footprint through resource-efficient reuse and reduced waste); Target 15 (business assessment, disclosure and reduction of nature-related impacts).

Potential interlinkages: **Positive:** Reduces the volume and toxicity of industrial effluent reaching freshwater systems, improving water quality, aquatic habitat and biodiversity while protecting drinking-water resources and reducing risks to human and animal health; lowers energy use for water heating, treatment and pumping, with climate stability co-benefits; improves resource efficiency and hence, operational resilience for clients in water-stressed regions. **Negative:** Energy-intensive treatment and residual waste streams can shift pressure from freshwater onto climate, air and soil if poorly managed; and tightened efficiency or discharge standards can disadvantage smaller operators.

Key considerations: Closed-loop water systems require careful management of treatment requirements, energy use and residual waste streams. Commercial viability depends on site-specific conditions and local water tariffs, which may not fully reflect water scarcity where subsidized, affecting the bankability and payback of water-reuse investments. The potential water benefits of reuse may also be assessed in the wider water system in which the client operates, as reducing freshwater withdrawals at an individual site does not necessarily translate into improved water availability at landscape or basin level where abstraction remains poorly governed, demand continues to increase, or saved water is reallocated to other uses. For banks, this highlights the importance of assessing both the facility-level economics of reuse and relevant basin-level risks, including water availability, allocation and abstraction regimes, competing users and the quality of water governance. Robust measurement of net freshwater savings is also important to support credible sustainability-linked KPI structures.

Examples of high-impact sectors and financing opportunities:

- **Food and beverage processing (ISIC C1010–C1109/NACE C10.11–C11.07):** Closed-loop process-water systems, wastewater treatment and reuse, and recovery and reuse of water across industrial processes.
- **Pharmaceuticals (ISIC C2100/NACE C21.10–C21.20):** Water recovery, treatment and reuse systems for process and utility water, subject to applicable quality and hygiene requirements.
- **Steel and basic metals (ISIC C2410–C2439/NACE C24.10–C25.53):** Closed-loop cooling-water systems, process-water recycling and wastewater treatment and reuse.
- **Mining and quarrying (ISIC B0510–B0990/NACE B05.10–B09.90)**: Water recycling and reuse in mineral processing, tailings and mine-water management, including treatment and reuse of mine-impacted water.
- **Semiconductors and electronics (ISIC C2610-C2640/NACE C26.11–C26.40):** Water recovery and recycling, closed-loop process-water systems and treatment of wastewater for reuse, including recovery and recycling of ultra-pure process water.
- **Paper and pulp (ISIC C1701–C1709/NACE C17.11–C17.29):** Process-water recycling, closed-loop water systems and wastewater treatment and reuse within production processes.
- **Water supply and wastewater treatment (ISIC E3600–E3700/NACE E36.00–E37.00):** Infrastructure project finance, green and blue bonds, and sustainability-linked lending to utilities and private operators delivering the municipal wastewater reclamation and water reuse infrastructure underpinning circular water systems at city and industrial-park scale.

3.2.2 Urban water reuse

Urban areas account for a growing share of global freshwater demand, driven by population growth, urbanization and the expansion of water-intensive urban services, while simultaneously generating significant volumes of wastewater that are inadequately treated and discharged to freshwater ecosystems in many parts of the world (UN, 2024; He and others, 2021). Circular urban water systems, including municipal wastewater reclamation, stormwater harvesting, aquifer storage and recovery, and water-sensitive urban design, can greatly reduce urban net freshwater demand while improving the quality of water returned to freshwater systems. For banks, urban water infrastructure is a substantial and growing lending opportunity, particularly in emerging market cities where the water supply gap is widening and investment in water infrastructure is urgently needed. The growing frequency of urban water crises, such as the near-complete exhaustion of Cape Town's reservoir system in 2018 (NASA, 2018) and the recurrent water stress events in major Asian cities (Climate Adaptation Platform, 2026), underscores the financial materiality of urban water risk for infrastructure and real estate portfolios. Section 3.3.3—Portfolio composition and financing—provides an overview of potential delivery and financing structures that can unlock this pipeline, including concessions, hybrid annuity models, guarantees and reuse-certificate markets.

GBF alignment: Target 7 (reduce pollution, including from untreated and partially treated wastewater discharge); Target 11 (maintenance and restoration of regulating services, including water quality regulation); Target 12 (enhance green and blue spaces in urban areas); Target 2 (restoration of degraded inland water ecosystems).

Potential interlinkages: **Positive:** Reduces the volume of untreated and partially treated wastewater discharged to urban waterways and coastal systems, easing eutrophication, pathogen contamination and aquatic habitat loss, with co-benefits for water quality and human health; nature-based stormwater management creates urban freshwater habitats supporting biodiversity; reduced abstraction helps maintain ecological minimum flows; and improved climate adaptation and disaster resilience for cities and water-dependent facilities. **Negative:** Advanced treatment can be energy-intensive and may generate residual waste, risking a shift of pressure from freshwater onto climate, air and soil if poorly managed; expanding reuse without demand management can raise overall abstraction rather than reduce it; and tightened standards can disadvantage smaller operators.

Key considerations: Advanced treatment requires careful management of energy use, micropollutants and pathogens. Banks may also assess catchment-level impacts, as expanding water reuse without managing demand may increase overall abstraction rather than reduce freshwater pressures. Urban water reuse infrastructure is capital-intensive and depends on long-term tariff and offtake arrangements, making projects well suited to blended finance and risk-sharing mechanisms that can mitigate political, counterparty and revenue risks. Tariff and permitting risk, the creditworthiness of the public offtaker and long construction periods are typically the binding constraints of bankability.

Examples of high-impact sectors and financing opportunities:

- **Municipal water and wastewater utilities (ISIC E3600–E3700/NACE E36.00–E37.00):** Water reclamation, wastewater treatment and reuse, decentralized water-reuse systems and recovery of water from wastewater.
- **Residential and commercial real estate (ISIC L6810–L6820/NACE L68.10–L68.20):** Buildings and developments incorporating greywater reuse, rainwater harvesting, onsite wastewater treatment and reuse, and other systems that enable water to be reused within or across buildings.
- **Urban construction and civil engineering (ISIC F4100–F4290/NACE F41.10–F42.99):** Construction and rehabilitation of infrastructure for wastewater collection, treatment, water reclamation and reuse, including decentralized and district-scale reuse systems.
- **Hotels, resorts and urban hospitality (ISIC I5510–I5590/NACE I55.10–I55.90):** Greywater reuse, treated wastewater reuse, rainwater harvesting and closed-loop water systems, particularly in water-stressed cities and tourist destinations.
- **Data centers and digital infrastructure (ISIC J6311/NACE J63.11):** Closed-loop cooling, cooling-water recycling and use of reclaimed or other non-potable water sources.

3.2.3 Agricultural water use efficiency

Agriculture is the largest user of freshwater globally, consuming approximately 70% of total freshwater withdrawals and a far higher share in water-stressed agricultural basins across South Asia, the Middle East, North Africa and parts of Sub-Saharan Africa (UNESCO, 2024). Certain irrigation methods, particularly flood and furrow irrigation, which remains prevalent in many parts of the world, can result in significant water losses through evaporation, runoff and percolation, reducing the amount of water effectively available to crops. For banks with significant agricultural portfolios, declining irrigation water availability directly threatens the income and collateral value of their clients, especially in water-stressed regions (FAO, 2023b).

Improving irrigation efficiency and managing water inputs have long been central to agricultural productivity and are therefore not new areas of investment. However, the business case is strengthening as water scarcity and costs rise, particularly in systems where water-efficiency measures also reduce the energy required for irrigation pumping or treatment. Beyond lowering clients' input costs, water-use efficiency can open new markets and financing opportunities for banks, particularly around water-efficient technologies and practices such as precision irrigation, improved irrigation scheduling, soil-moisture monitoring and water-retentive farming. Depending on the context, these measures can reduce water consumption while maintaining or improving yields, with precision irrigation and regenerative practices estimated to reduce agricultural water use by 30–65% (Gopal and others, 2025). While costs can rise during the first two to five years, research shows that regenerative farming practices become more profitable than conventional ones after three to five years across farm sizes, driven principally by higher yields and lower input costs (UNEP FI and others, 2025).

The main financing challenge is thus not the absence of economic benefits, but the initial transition period, as well as the scale and fragmentation of agricultural investments, particularly where individual farms are too small to support standalone financing. Blended finance and other de-risking mechanisms can be particularly relevant where the upfront investment or transition risks remain beyond the risk appetite of conventional agricultural lending, while the longer-term combination of lower input costs, improved water productivity and greater resilience can support stronger farm economics and repayment capacity (Khemka and Eberhard, 2025). Where the benefits of water-efficiency investments extend beyond individual farms to multiple businesses and stakeholders across a landscape, aggregation models can help overcome these barriers by pooling demand and sharing costs. Landscape Enterprise Networks (LENs), for example, bring together businesses that depend on the same landscape—including food and beverage companies, water utilities, local governments and insurers—with groups of farmers that deliver the interventions. This allows the costs of measures such as regenerative agriculture and NbS to be shared among multiple beneficiaries rather than borne by a single buyer. For banks, such models can aggregate otherwise fragmented opportunities into larger financing relationships, while helping smaller farmers access funding and providing corporate funders with a mechanism for co-financing interventions across a shared landscape (UNEP FI and others, 2025).

GBF alignment: Target 10 (sustainable management of agriculture, including biodiversity-friendly practices); Target 7 (reduce nutrient and pesticide runoff to levels not harmful to biodiversity); Target 11 (maintenance and restoration of regulating services, including soil health and water regulation); Target 2 (restoration of degraded ecosystems, including inland waters).

Potential interlinkages: **Positive:** Reduced basin-level abstraction sustains ecological flows and slows groundwater depletion, supporting food security in water-stressed basins; soil-building regenerative practices improve water infiltration and reduce agrochemical runoff, protecting soil quality and drinking-water resources and reducing associated risks to human and animal health; and reduced dependence on synthetic fertilizers and pesticides eases chemical pressure on freshwater systems while lowering input costs and exposure risks for farmers and rural communities, supporting livelihoods and smallholder resilience. **Negative:** Efficiency gains can raise rather than reduce basin-level abstraction where saved water enables expanded or more water-intensive cropping; equipment costs or tightened standards can disadvantage smaller farmers.

Key considerations: Water savings deliver ecological benefits only if they remain in the catchment, so banks may assess basin-level abstraction and, where possible, tie financing to water allocation or abstraction limits rather than efficiency metrics alone. Where small ticket sizes or insecure land and water rights limit bankability, aggregation or blended finance is often needed to reach smallholders.

Examples of high-impact sectors and financing opportunities:

- **Crop production (ISIC A0111–A0129/NACE A01.11–01.29):** Irrigation upgrades, precision irrigation, soil-moisture monitoring, irrigation scheduling and farm-level water-management systems that reduce freshwater withdrawals and improve water productivity.
- **Agricultural support activities (ISIC A0161/NACE A01.61):** Irrigation advisory services, precision-agriculture services, remote sensing and other technologies that enable farmers to optimize irrigation and reduce water losses.
- **Manufacture of agricultural and forestry machinery (ISIC C2821/NACE C28.30):** Drip, micro- and subsurface irrigation equipment, variable-rate irrigation systems, pumps, sensors and other technologies that improve irrigation efficiency.
- **Construction of water projects (ISIC F4290/NACE F42.91):** Modernization of irrigation networks, canal lining, conveyance systems, reservoirs and other infrastructure that reduces water losses between water sources and agricultural users.
- **Greenhouse, horticulture and controlled-environment agriculture (ISIC A0113/NACE A01.13):** Closed or recirculating irrigation systems, hydroponic and other controlled-environment production systems that reduce freshwater demand and enable precise water application.
- **Agri-commodity trading and offtake (ISIC G4620/NACE G46.21–46.23):** Supply-chain and working-capital finance linked to water-efficiency criteria in agricultural sourcing, including supplier requirements and incentives for adopting efficient irrigation and water-management practices.

3.3 Practical implementation across PRB action categories

The following tables outline how banks can embed circular freshwater solutions into each of the four PRB action categories, with relevance across diverse portfolio compositions and geographic contexts. The proposed actions are non-exhaustive and to be adapted to each bank's portfolio composition, geographic context and institutional capacity. Banks operating in regions with high concentrations of water-intensive industries or severely water-stressed catchments may prioritize actions relevant to their specific freshwater ecosystem exposure profiles.

3.3.1 Policies, processes and culture

Banks may integrate freshwater considerations into their risk management, due diligence and sector policies that inform lending and investment decisions, with an illustrative list of actions provided in Table 5. This helps identify where water-related dependencies, impacts and risks are financially material, prioritize exposures to water-stressed basins or degraded freshwater ecosystems and identify opportunities to support circular water solutions. Quantitative water-risk tools, including the WWF Water Risk Filter, WRI Aqueduct Water Risk Atlas and CDP Water Security disclosure framework, can support systematic portfolio screening, while sector-specific criteria can reflect the different water-related risks, dependencies and circular transition opportunities associated with clients' activities. Table 5 provides an overview of potential actions banks can take.

Table 5: Actions to integrate circular freshwater solutions into policy, processes and culture, and expected impact (non-exhaustive)

Agricultural water use efficiency | Urban water reuse | Industrial water reuse | Across all three

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Due diligence, risk assessment and other internal processes		
Integrate freshwater dependencies, impacts and risks into environmental and social due diligence, KYC and credit-risk assessments, considering basin-level water stress, water availability and quality, abstraction, discharge and ecosystem exposure. Assess portfolio exposure to physical and transition risks, including water scarcity, changing allocation and discharge requirements and water-pricing developments.	Strengthens identification of financially material freshwater risks and dependencies, helps identify concentrations of water-related financial risk and supports more consistent risk-based lending, client assessment and prioritization.	Across value chain
For relevant water-intensive clients and projects, assess the technical and commercial viability of circular water solutions, including water reuse and recycling systems and agricultural water-use measures, taking account of water quality requirements, infrastructure needs, regulatory conditions, offtake arrangements and local water-pricing structures.	Helps distinguish viable circular water opportunities from projects facing material technical, regulatory, or economic barriers, supporting more informed financing and client engagement decisions.	Across value chain
Sectoral policies and other internal processes		
Integrate freshwater ecosystem considerations into sectoral lending policies and relevant internal strategies, including criteria and measurable objectives for water stewardship, reduced abstraction, water reuse and recycling, responsible discharge management and protection of freshwater ecosystems, aligned with relevant frameworks, regulations and standards.	Provides a consistent framework for managing freshwater-related risks and opportunities across relevant sectors and geographies, strengthening the integration of water considerations into financing decisions and supporting more systematic identification of circular water solutions.	Across value chain
Data collection and management		
Integrate freshwater dependency, impact and risk data into environmental assessments for relevant clients, covering water withdrawals, recycling and reuse rates, discharge quality, basin-level water stress and proximity to freshwater biodiversity hotspots or protected wetlands, using tools such as ENCORE, TNFD LEAP and CDP Water Security.	Provides a more complete picture of clients' water-related dependencies, impacts and risks; strengthens portfolio screening and prioritization of clients and locations where water-related risks and circular water opportunities are most material.	Across value chain

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Portfolio impact analysis		
Assess portfolio exposure by water-intensive sub-sector, client type and basin-level water stress, using water-risk scenario analysis to identify physical risks from scarcity, regulatory risks from tightening allocation and discharge rules, and transition risks from water-pricing reform, and prioritize clients and geographies where water-related risks and circular water opportunities are most material.	Identifies concentrations of water-related financial risk and helps prioritize portfolio segments, clients and geographies for risk management, engagement and circular water financing.	Across value chain
Embedding circularity into banks' client engagement strategies		
Develop a client engagement framework that integrates circular water solutions—including reuse and efficiency—into engagement with relevant clients, with approaches tailored to sector, basin context, client maturity and identified water-related risks and opportunities.	Embeds circular water considerations into routine client engagement and helps relationship managers identify transition needs, financing opportunities and appropriate support across different client and portfolio contexts.	Across value chain
Capacity building and training		
Develop training and practical guidance for board members, employees and relationship managers covering freshwater dependencies and water-risk assessment, circular water business models, relevant water stewardship standards and certification schemes (e.g. AWS Standard), and disclosure and risk-management frameworks (e.g. TNFD and CDP Water Security).	Strengthens internal capacity to identify freshwater-related risks and circular water opportunities, supports more consistent client engagement and financing decisions, and improves the integration of freshwater considerations across relevant functions.	Across value chain

3.3.2 Client engagement

Effective client engagement can help banks identify financing opportunities, strengthen client relationships and manage freshwater risks. By working with clients to understand their dependencies and impacts, banks can support credible transition pathways and identify opportunities associated with circular water solutions. Engagement may also consider the social and economic context in which water use takes place, recognizing that the impacts and feasibility of circular water transitions may differ across smallholder farmers, rural communities and other water-dependent groups, including women and girls who often bear a disproportionate burden of water collection, particularly in developing countries.

The focus of engagement will vary across sectors and geographies, reflecting differences in water dependencies, basin conditions, business models and environmental pressures. Table 6 provides illustrative actions across the client engagement cycle, from initial dialogue and assessment through to support, financing and monitoring. For further details, see Guidance on Client Engagement by UNEP FI (2024e).

Table 6: Actions to integrate circular freshwater solutions into client engagement, and expected impact (non-exhaustive)

Agricultural water use efficiency | Urban water reuse | Industrial water reuse | Across all three

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Scene setting and opening dialogue		
Use portfolio and water-risk analysis to identify priority clients for engagement and introduce the financial implications of freshwater dependencies, basin-level water risks and relevant circular water opportunities.	Focuses client engagement on material water-related risks and opportunities and creates a basis for identifying transition and financing needs.	Across value chain
Open dialogue with relevant industrial clients on freshwater dependencies, basin-level water risks and the business case for water reuse, recycling and improved discharge management.	Builds awareness of the links between freshwater ecosystem health, business continuity and operational resilience, creating a basis for circular water investment.	Circular value recovery
Engage agricultural clients on irrigation water risks, the financial implications of water scarcity and opportunities to improve water productivity through more efficient irrigation and water management.	Connects water-use practices to freshwater depletion and farm-level resilience, creating a basis for investment in water-use efficiency.	Circular use
Engage municipal, infrastructure and real estate clients on the financial and operational implications of water scarcity, wastewater generation and ageing water infrastructure, including opportunities for water reuse and reclamation.	Builds awareness of circular urban water opportunities and supports consideration of investments that reduce freshwater abstraction and improve wastewater management.	Circular value recovery
Needs assessment and awareness raising		
Assess priority clients' water dependencies, impacts, management practices and transition readiness, considering water intensity, abstraction, recycling and reuse, discharge quality and basin context.	Provides a basis for identifying material water-related risks, transition needs and opportunities for circular water investment.	Across value chain

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Defining support plans		
Work with priority clients to define transition pathways covering relevant circular water measures, investment needs, implementation timelines, financing requirements and agreed performance indicators.	Translates identified water-related risks and opportunities into credible transition pathways and a pipeline of potential financing opportunities.	Across value chain
Designing and offering products and services to implement support plans		
Match eligible industrial clients with financing for water reuse and recycling, including closed-loop systems, wastewater treatment and on-site reuse.	Supports investment that can reduce freshwater abstraction and improve discharge quality while strengthening operational resilience.	Circular value recovery
Match municipal, infrastructure and real estate clients with financing and appropriate delivery structures for wastewater reclamation, reuse networks and other circular urban water infrastructure.	Supports reduced abstraction and improved wastewater management while creating investable infrastructure opportunities.	Circular value recovery
Match agricultural clients with financing for water-use efficiency measures, including precision irrigation, irrigation upgrades and soil-water management.	Supports reduced irrigation abstraction and improved water productivity, particularly in water-stressed basins.	Circular use; circular design and production
Use blended finance, guarantees and other risk-sharing structures where circular water investments face affordability, scale or bankability constraints.	Helps bring commercially promising circular water investments to market and mobilizes additional private capital for freshwater outcomes.	Across value chain
Monitoring		
Monitor agreed client-level water KPIs, such as abstraction, water reuse and recycling, discharge quality and relevant agricultural water-use indicators, and use results to inform ongoing engagement and financing decisions.	Tracks progress against agreed water outcomes, supports evidence-based client engagement and identifies where further financing or intervention may be appropriate.	Across value chain

3.3.3 Portfolio composition and financing

Banks have an important role in scaling circular water investments by directing financing towards water reuse, recycling and efficiency solutions and integrating freshwater-related risks and opportunities into financing decisions. Financial instruments include sustainability-linked loans with water-related KPIs,[7] green bonds, project finance, equipment finance and leasing, and blended finance combining commercial debt with concessional or development finance. For larger municipal and industrial reuse projects, delivery structures such as design-build-operate (DBO), design-build-finance-operate-transfer (DBFOT) and hybrid annuity models can allocate construction, operating and performance risks between public and private parties. Programmatic approaches that bundle multiple reuse projects can reduce transaction costs and enable commercial bank participation at scale, while payment, offtake and partial credit guarantees can strengthen project bankability where counterparty creditworthiness is limited (Khemka and Eberhard, 2025).

The commercial viability of reuse investments also depends on the local water-pricing and regulatory context. Where freshwater abstraction and discharge are significantly underpriced relative to their environmental and infrastructure costs, recycled water may not yet be commercially competitive with conventional freshwater sources. Banks therefore benefit from assessing tariff structures, abstraction and discharge charges, regulatory requirements, offtake commitments and other revenue drivers when evaluating reuse investments. Water-pricing reform and stronger allocation or discharge regulation may be important preconditions for scaling commercially viable reuse markets. Banks can also participate in emerging market-based mechanisms, such as wastewater reuse certificates, where appropriate regulatory frameworks establish credible reuse targets and trading mechanisms (World Bank Group, 2021b). While still at an early stage, such mechanisms could create additional incentives for investment in wastewater reuse.

At the basin scale, water funds and payments for watershed services provide mechanisms for downstream beneficiaries, including utilities, municipalities and water-dependent companies, to finance the protection and restoration of source-water ecosystems. For banks, these structures offer opportunities to combine commercial, public and philanthropic capital, support collective catchment action and link financing to measurable basin-level outcomes. Water funds can also complement financing for agricultural water-use efficiency, where equipment finance, leasing, sustainability-linked agricultural lending and blended finance support distributed investments by farmers and rural communities. Table 7 illustrates how banks can support and scale these investments through targeted financing approaches.

7 Examples of indicators include: water use reduction or water saving (%/year, m³/year); water withdrawal reduction (m³/year); water consumption reduction or water saving per user or service (%/year, m³/year); water treatment capacity per year (m³/year); percentage reduction in nutrient load (nitrogen, phosphorus, biological oxygen demand, chemical oxygen demand) (%); percentage of wastewater reused (%); additional volume of water treated per year (m³/year). For more information, see IFC *Guidance for Blue Finance* (IFC, 2025).

Table 7: Actions to integrate circular freshwater solutions into portfolio composition and financing, and expected impact (non-exhaustive)

Agricultural water use efficiency | Urban water reuse | Industrial water reuse | Across all three

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Increasing circular financing with positive impact		
Increase financing for industrial water reuse and recycling, including closed-loop process-water systems, wastewater treatment and on-site reuse, with financing structures matched to project scale and client creditworthiness.	Reduces freshwater abstraction and contaminated discharge while improving water quality and operational resilience.	Circular value recovery
Increase financing for circular urban water infrastructure, including wastewater reclamation and reuse, reuse networks, stormwater management, urban wetlands, aquifer recharge and other water-sensitive urban design solutions, using appropriate project finance and risk-sharing structures.	Reduces pressure on rivers and aquifers, improves wastewater and stormwater management, supports groundwater recharge and strengthens urban freshwater ecosystem health.	Circular value recovery; circular design and production
Increase financing for agricultural water-use efficiency and water-retentive practices, including precision irrigation, irrigation upgrades, soil-moisture management, regenerative farming and riparian buffers that reduce irrigation withdrawals and runoff.	Reduced agricultural water withdrawals and runoff, improved water-use efficiency and soil water retention, and increased resilience to water scarcity.	Circular design and production; circular use
Increase financing for landscape-scale water management and NbS such as watershed restoration, reforestation for hydrological regulation, water harvesting and managed aquifer recharge, through basin-level water funds, payments for watershed services and blended finance structures that combine commercial, public and philanthropic capital.	Improved water security and resilience through restored watersheds, enhanced water availability and quality, improved groundwater recharge, and reduced water-related risks for communities and businesses.	Circular design and production; circular support
Increase financing for circular water value chains through programmatic or platform-based approaches that aggregate projects such as water-footprint reduction programmes, industrial water-sharing networks and wastewater valorization, reducing transaction and financing costs and enabling commercial bank participation at scale.	Accelerates deployment of circular water solutions across multiple clients and locations, increasing aggregate reductions in freshwater abstraction and pollution, while recovering and reusing water, nutrients and energy across value chains.	Circular value recovery

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Increase financing of enabling infrastructure and digital technologies that scale circular water solutions—IoT leak detection, smart irrigation platforms, real-time water quality monitoring, and water accounting and trading platforms.	Addresses systemic barriers to circular water transitions at scale; digital management enables more efficient and transparent allocation and use, reducing aggregate abstraction.	Circular support
Decreasing financing with negative impact		
Apply enhanced due diligence and, where appropriate, transition criteria to financing for activities associated with significant pressures on freshwater ecosystems that lack credible, time-bound transition plans.	Supports a gradual reduction in key pressures on freshwater ecosystems, including over-abstraction and pollution, while encouraging credible transition pathways.	Across value chain

3.3.4 Stakeholder engagement and partnerships

Freshwater challenges and circular water solutions are inherently catchment-based and require collective action. Through their relationships with multiple stakeholders and water users within a catchment, banks are well positioned to catalyse basin-level coordination, mobilize investment and support improved water governance beyond individual client interventions. Collaboration through water stewardship initiatives and basin-level partnerships can help banks finance watershed conservation while strengthening impact measurement and reporting. Potential actions banks can take are provided in Table 8 below.

Table 8: Actions to integrate circular freshwater solutions into stakeholder engagement and partnerships, and expected impact (non-exhaustive)

Agricultural water use efficiency Urban water reuse Industrial water reuse Across all three

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Engaging with policymakers		
Engage with policymakers and relevant industry platforms on water governance issues that affect clients and portfolios, including water pricing, abstraction and discharge regulation, stewardship reporting and integration of freshwater ecosystem considerations into water security and river basin planning.	Supports a stronger enabling environment for circular water investment and more effective management of freshwater risks across client portfolios.	Across value chain

Actions to integrate circular freshwater solutions into nature strategies and targets (bank level)	Impact on freshwater ecosystems (client level)	Circular business model category
Partnering with other financial institutions, including DFIs		
Partner with development finance institutions to co-develop blended finance platforms for circular water investment in emerging markets where commercial risk would otherwise preclude bank participation.	Extends circular water financing to geographies where freshwater degradation is most severe; blended structures de-risk first-mover investments and catalyse private capital.	Circular support
Engage other commercial banks through industry platforms to share good practices on freshwater risk integration and develop approaches for measuring and reporting portfolio-level freshwater impacts.	Strengthens consistency in freshwater risk and impact assessment across the banking sector, improves comparability of portfolio-level outcomes and supports more credible identification and scaling of circular water opportunities.	Circular support
Collaborate with insurers and pension funds to develop freshwater risk-transfer instruments such as parametric insurance for water scarcity, ecosystem service-linked bonds and watershed conservation structures including water funds.	Unlocks additional private capital for freshwater conservation; parametric products create direct incentives for clients and communities to invest in watershed protection.	Circular support
Engaging with industry initiatives, civil society and academia		
Partner with initiatives such as the Alliance for Water Stewardship, the CEO Water Mandate, NGOs and Indigenous water-rights organizations to strengthen water stewardship practices and circular water approaches across water-intensive sectors and supply chains.	Supports greater consistency in water stewardship practices and helps align client engagement with the ecological and social conditions of specific catchments.	Across value chain
Fund and collaborate with research institutions on circular water technologies, freshwater monitoring and impact-assessment methods, including precision fertigation, constructed wetland design and tools for assessing freshwater biodiversity impacts.	Supports development and scaling of circular water solutions and strengthens the evidence base for assessing freshwater ecosystem outcomes and informing financing decisions.	Circular support

4. Terrestrial and land ecosystems

4.1 Impact, risk and opportunity landscape

Land-use change—mainly driven by the conversion of natural habitats to agricultural and forestry uses—is the largest direct driver of biodiversity loss in terrestrial ecosystems (IPBES, 2019). The world has lost approximately half of its original forest cover, with the remaining primary and high-integrity forests disappearing at a rate of millions of hectares per year, concentrated in the tropical biomes of South America, Central Africa and Southeast Asia (FAO, 2020a). Agriculture is responsible for approximately 70–80% of global deforestation, with a small number of commodities—beef, soy, palm oil, timber and pulp, cocoa and coffee—accounting for the majority of tropical forest conversion (Pendrill and others, 2022).

The physical consequences of continued deforestation and ecosystem conversion are increasingly materializing as tangible financial risk in bank portfolios, driven by the progressive loss of critical ecosystem services—from soil fertility to pollination and flood protection—on which our economies fundamentally depend. The World Bank estimates that the collapse of select ecosystem services could result in a decline in global GDP of US$ 2.7 trillion annually by 2030 (World Bank Group, 2021a), with the most nature-dependent sectors facing the greatest exposure, including agriculture, food and beverage, construction and materials-intensive manufacturing sectors (IPBES, 2019).

Tightening environmental standards, shifting consumer preferences and supply chain due diligence requirements are giving rise to growing transition risks for banks with exposures to agriculture, forestry, soft commodities and land-intensive manufacturing. In Europe, for instance, the European Union Deforestation Regulation (EUDR), which entered into force in 2023, is an early signal of a broader regulatory shift that will reshape the risk profiles of land-intensive businesses across global supply chains (Global Canopy, 2026). Clients unable to demonstrate deforestation-free sourcing face material market access risk, while those investing in sustainable land management and supply chain traceability are increasingly positioned as lower-risk counterparties and candidates for sustainability-linked financing. Beyond risk mitigation, circular land use presents opportunities for banks to finance more resilient business models and tap into emerging markets that reduce resource inputs, maintain soil and ecosystem functions, and create new sources of value from land and biomass, for example, through certified sustainable agricultural commodities and forestry products.

4.2 Focus areas: Circular solutions in terrestrial ecosystems

This chapter presents circular solutions with significant potential to reduce growing nature-related risks, unlock new financing opportunities for banks, and align with emerging regulatory and market frameworks reshaping risk profiles across land-dependent industries.

Each solution area generates co-benefits across climate, biodiversity, food security and social equity dimensions. Realizing those benefits depends on a holistic approach, one that ensures interventions deliver net-positive outcomes rather than shifting pressure elsewhere, and that designs circular land use with genuine respect for Indigenous land rights, smallholder livelihoods, rural communities and the food security and cultural identity of communities whose stewardship sustains these ecosystems. The chapter does not examine regenerative agriculture or the reduction of food loss and waste, as these topics were addressed in earlier guidance on Circular Solutions to Achieve Climate Targets in the Agrifood Sector (UNEP FI, 2024d).

Distinguishing circular land-use activities from complementary nature-finance activities is important for identifying appropriate financing opportunities and assessing how multiple revenue streams can support bankability. Box 2 sets out this distinction and introduces the concept of revenue stacking in circular land use.

Box 2: Circular land use models and revenue stacking

Beyond efficiency and risk reduction, circular land use opens a value-creation model in which a single landscape supports several coexisting income streams. On the same hectares, land managers can layer—or "stack"—sustainable commodity premiums (certified timber, cocoa, coffee, palm oil), carbon credits from restoration or avoided conversion, emerging biodiversity credits, PES schemes such as watershed protection and pollination, and non-timber forest products. Agroforestry and silvopasture (e.g. shade-grown cocoa or coffee, trees integrated into grazing systems), native forest restoration, and mangrove or peatland restoration are archetypes in which two or more of these streams already coexist. Such systems can improve the economics of sustainable land management by diversifying and increasing revenues from the same land base, while strengthening the cash-flow profile for banks and reducing reliance on any single revenue stream.

Not all of these mechanisms are circular in a strict sense: carbon credits, biodiversity credits and PES protect or enhance natural capital without themselves closing a biological or material loop. They remain valuable, but as complementary nature finance, becoming part of a circular strategy only when coupled with demand-side measures that remove the economic pressure to convert land in the first place. Circularity on land, following Morseletto (2020), works through two cycles. In the *biological cycle*, an activity regenerates—or, where the resource base is already degraded, restores—the living foundation of production: soil formation, nutrient cycling, water regulation and natural regeneration, so that the landscape renews rather than depletes itself. In the *technical cycle*, it closes material loops: cascading harvested biomass through

successive uses, recycling fiber, and substituting renewable materials for virgin or emissions-intensive ones. Distinguishing circular finance from nature finance matters for how banks label, structure and report land-based lending. UNEP FI *Circular Economy Finance Guidelines for the Agriculture Sector* provide a practical methodology for making this distinction operational and help institutions classify which client activities qualify as circular—closing nutrient loops, restoring soil health, recovering biomass at higher value—and, where criteria are not yet met, identify targeted engagement opportunities to advance the transition (UNEP FI, 2026b).

4.2.1 Reducing pressure from agricultural land-use change

Agricultural expansion is the leading driver of terrestrial biodiversity loss,[8] destroying natural habitats and releasing large quantities of stored carbon as forests, savannahs, wetlands and grasslands are converted to cropland and pasture (Pendrill and others, 2022). Livestock and feed production account for most deforestation-linked expansion, particularly for beef, soy, palm oil, cocoa and timber (Poore and Nemecek, 2018).

The circular economy offers a fundamentally different paradigm: produce more from less, close input loops and eliminate waste, reducing the need for additional land and preserving the natural ecosystems that underpin long-term agricultural productivity. Deforestation- and conversion-free supply chains ensure that land-intensive commodities can only access major markets when their origin is verified as free from deforestation and natural ecosystem conversion, thereby transforming market access requirements into a structural driver of land-use behaviour across global supply chains. On the supply side, sustainable intensification through precision agriculture, digital farm management and improved agronomy can raise yields on existing farmland, with modelling suggesting that closing yield gaps could meet projected food demand to 2050 without net expansion into natural ecosystems (WRI, 2019). Agroforestry and silvopasture lift the output and diversify the revenue a given area can produce by integrating trees into cropland and grazing systems (Griscom and others, 2017). What distinguishes a circular transaction from generic sustainable finance is where the capital is directed, specifically, towards solutions that enable "producing more from less", such as increasing yields on existing farmland while reducing the inputs, resource use and waste that drive environmental pressures.

For banks, financing circular solutions that avoid agricultural expansion is both a risk-management imperative—given EUDR compliance requirements and expanding national deforestation legislation—and a commercial opportunity. Clients able to demonstrate deforestation-free sourcing and improving resource productivity gain privileged market access and become candidates for sustainability-linked lending, while those who cannot face growing market exclusion and regulatory risk (EU, 2023). The transition also creates new financing opportunities across emerging markets for precision agriculture, digital farm management, traceability technologies and other solutions that enable more productive and resource-efficient land use. For agricultural clients, these approaches can reduce input costs and dependence on increasingly scarce or volatile resources, while strengthening productivity and resilience.

8 This section focuses on land-use change associated with agricultural expansion and does not cover other drivers of natural ecosystem conversion, including mining, infrastructure development and urban expansion.

GBF alignment: Target 1 (spatial planning, loss of high-biodiversity-importance areas close to zero); Target 10 (sustainable agriculture and forestry); Target 16 (consumption footprint); Target 15 (business impacts along supply chains).

Potential interlinkages: **Positive:** Reduces terrestrial carbon emissions from land-use change and helps maintain forest carbon sinks; improves long-term soil fertility and agricultural productivity through regenerative intensification; improves land-use efficiency, lowering input costs and potentially increasing yields, land values and revenues, including through certification and other stacked income streams (see Box 2); and protects the food security, livelihoods and cultural heritage of Indigenous communities and smallholders dependent on intact ecosystems adjacent to farmland. **Negative:** Efficiency and yield gains can trigger rebound expansion into natural ecosystems unless coupled with land protection; deforestation-free sourcing can shift pressure to lower-tier suppliers or other regions through leakage; land-sparing substitutes such as controlled-environment or vertical farming are energy-intensive and can raise emissions where powered by carbon-intensive grids; and tightened traceability and market-access standards, together with limited access to precision and digital technologies, can exclude smallholders and smaller producers.

Key considerations: Financing for sustainable intensification can incorporate land-use safeguards to reduce the risk that yield gains incentivize further agricultural expansion. Deforestation- and conversion-free financing can consider traceability across relevant supply chains, particularly where indirect sourcing may create risks of unverified land conversion. Banks can test circularity claims against cascading use and full life-cycle evidence rather than biobased labels alone, and ensure downstream biomass uses such as bioenergy complement rather than displace higher-value circular applications (EMF, 2026). Long payback periods for agroforestry and silvopasture, combined with small farm-level ticket sizes, may require aggregation, guarantees or blended finance structures to improve bankability and enable financing at scale.

Examples of high-impact sectors and financing opportunities:

- **Crop and livestock production (ISIC A0111–A0150/NACE A01.11–A01.50):** Sustainable intensification, agroforestry and silvopasture that increase productivity and diversify outputs on existing agricultural land, reducing the need for further conversion of natural ecosystems.
- **Agricultural support activities (ISIC A0161/NACE A01.61):** Precision-agriculture, farm-management and advisory services that improve resource efficiency, close input loops and increase productivity on existing agricultural land, reducing pressure for agricultural expansion.
- **Food and beverage manufacturing (ISIC C1010–C1104/NACE C10.11–C11.07):** Circular sourcing and processing models that reduce material losses, improve resource efficiency and increase the use of sustainably produced or recovered agricultural inputs, helping reduce upstream pressure on land.
- **Wholesale of agricultural raw materials (ISIC G4620/NACE G46.21–G46.23):** Supply-chain and commodity-finance approaches that support the uptake and scaling of circular agricultural production, including agroforestry, silvopasture and regenerative production, across supplier networks.

4.2.2 Forest restoration and circular use of wood products

Forests are foundational to the terrestrial economy and to planetary health. They cover approximately 31% of the Earth's land surface (FAO, 2020a), store more than half of all terrestrial carbon stocks (Harris and others, 2021) and are home to more than 80% of terrestrial species (FAO, 2020b). The services they provide extend far beyond their boundaries: forests regulate water cycles across entire river basins, moderate local and regional climates, protect soils against erosion and sustain the agricultural systems that billions of people depend on for food security. Yet global forest loss continues at approximately 10 million hectares per year, driven primarily by agricultural expansion, commercial logging and infrastructure development (FAO, 2020b), with the most biodiverse and carbon-dense primary and tropical forests bearing the greatest pressure.

This chapter is structured around two complementary approaches that diversify revenue streams while reducing pressure on natural forests:

i. Restoring degraded forests to rebuild ecosystem function and carbon storage; and
ii. Maximizing the value of harvested wood through cascading use, recycling and efficient material use.

To understand whether forestry propositions classify as circular, banks can evaluate them through a material lens: do they reduce demand for virgin materials, extend the productive life of harvested biomass, or regenerate the ecosystems that produce them? Activities that do not meet these criteria may still qualify as nature finance (e.g. PES), avoided conversion financed through carbon credits, or NbS—but may be recognized as complementary to, rather than constituting, a circular intervention (see box 2 for more information).

i. Restoring forests

Reforestation—through active planting and assisted natural regeneration (ANR) of native species—restores degraded land to productive and ecologically functional forest cover, rebuilding carbon sinks, biodiversity habitat, soil structure, nutrient cycling and water regulation capacity over the long term (Bastin and others, 2019). Beyond reforestation, restoring soil health and nutrient cycling on degraded agricultural and pastoral land can enable secondary forest succession and restore ecosystem function, potentially at lower cost than active tree planting. Agroforestry and silvopastoral systems can also support forest restoration by integrating trees into agricultural and grazing landscapes, delivering biodiversity, carbon and watershed co-benefits while maintaining productive land use and generating multiple income streams for land managers (Griscom and others, 2017).

For banks, forest restoration can serve both as a portfolio risk-management strategy and as an emerging financing opportunity. Banks have significant exposure to sectors dependent on functioning ecosystems, including agriculture, food and beverage, forestry and related commodity supply chains. Financing forest restoration can help address underlying physical and transition risks within these portfolios while supporting a growing market with substantial financing needs. Annual forest finance needs to increase from approximately US$ 84 billion in 2023 to US$ 300 billion by 2030, with private finance accounting for only around US$ 7.5 billion of total forest finance in 2023 (UNEP, 2025).

A range of novel financing instruments can support forest restoration, including green bonds with restoration-related use-of-proceeds frameworks, sustainability-linked loans linked to reforestation or biodiversity targets, and project finance for large-scale restoration programmes. Verified carbon credits can provide an additional revenue stream, while revenue stacking can combine carbon credits, biodiversity credits, sustainable timber and other ecosystem-service revenues to strengthen project economics and reduce reliance on a single revenue source (see box 2). These revenue models can

improve the investment case for restoration projects, but their viability depends on robust project design and due diligence. Banks therefore need to assess permanence, additionality and the credibility of impact claims, alongside safeguards to ensure that projects respect the rights, livelihoods and interests of local communities and Indigenous Peoples.

ii. Using forest resources more efficiently

Even where timber harvesting is sustainably managed, conventional supply chains often capture only part of the value of harvested wood by directing material prematurely to low-value uses or energy recovery. The circular economy principle of cascading use extends the productive life and value of wood by prioritizing successive higher-value applications, such as construction, furniture and panels, before recycling into fiber or composite materials and, ultimately, bioenergy (UNECE and FAO, 2023). This can reduce demand for virgin timber by keeping wood in productive use for longer and increasing the recycled content of wood-based products (Mair and Stern, 2017). Engineered timber products such as cross-laminated timber (CLT), glued laminated timber (glulam) and wood-based panels are expanding as substitutes for conventional construction materials, creating growing markets for sustainably sourced forest fiber (Grand View Research, 2025). At end of life, paper and cardboard recycling and wood recovery systems further close material loops and reduce virgin material demand.

For banks, circular wood value chains create financing opportunities across the forest-to-product life cycle, including sustainable forest management, engineered timber manufacturing, wood-fiber recycling and recovery infrastructure, and traceability systems that enable responsible sourcing. Financing these activities can help address infrastructure and coordination barriers that limit cascading use, while supporting higher-value wood products, extending material lifetimes and reducing dependence on virgin timber (UNECE and FAO, 2022). The diversity of activities across the value chain also creates opportunities for different financing structures, from corporate lending for established manufacturers and recycling facilities to project finance for new processing and recovery infrastructure. More broadly, assessing circularity across these activities can help banks identify opportunities to reduce resource-related risks, strengthen supply-chain resilience and engage clients on the transition towards more circular business models (UNEP FI, 2026b).

GBF alignment: Target 2 (restoration); Target 3 (30-by-30); Target 10 (sustainable forestry); Target 16 (consumption footprint through material efficiency and cascading use); Target 8 (climate mitigation and adaptation through NbS).

Potential Interlinkages: **Positive:** Sequesters and stores carbon in standing forests and long-lived wood products while substituting for emissions-intensive concrete and steel; safeguards watershed regulation, dry-season flows and soil stability underpinning adjacent agriculture and freshwater systems; and protects the habitat and ecological corridors sustaining most terrestrial species. Socially, it generates rural employment and diversified income, creates premium and green-building markets that improve the economics of responsible forestry, and strengthens forest-dependent livelihoods, including those of Indigenous Peoples and local communities. **Negative:** Poorly designed restoration or plantation forestry can harm biodiversity and disturb soil, water and land where native ecosystems are replaced with monocultures or invasive trees; water-demanding or non-native species can increase pressure on local water resources and adversely affect landscapes; harvesting and processing carry occupational health and decent-work exposure; pulp and paper processing can also generate significant air, water and other pollutants. Where recovery infrastructure is weak or policy favours energy recovery, harvested biomass is routed to low-value combustion rather than cascading through higher-value uses, undermining circularity.

Key considerations: Restoration outcomes depend on ecosystem-appropriate design, robust additionality and permanence, and meaningful community participation. Species selection matters, as non-native or water-demanding species can increase pressure on local water resources and affect ecosystem functioning, as observed in some eucalyptus and teak plantations. Carbon-financed protection may be complemented by demand-side measures that reduce pressure on forests, rather than relying on conservation finance alone. Downstream processing may also be considered, as pulp and paper production can generate significant water, energy and pollutant impacts. Cascading use requires adequate collection, sorting and reprocessing infrastructure, and policies that prioritize energy recovery over higher-value material applications that can undermine circularity (EMF, 2026).

Examples of high-impact sectors and financing opportunities:

- **Forestry and logging (ISIC A0210–A0240/NACE A02.10–A02.40):** Forest restoration, reforestation, assisted natural regeneration, agroforestry and sustainable forest management practices that regenerate forest resources and maintain productive forest cover, alongside improved utilization of harvested biomass.
- **Paper and pulp manufacturing (ISIC C1701–C1709/NACE C17.11–C17.29):** Increased use of recycled and recovered fiber, fiber recovery and recycling systems, and alternative or sustainably sourced fibers that reduce demand for virgin forest resources.
- **Wood products manufacturing (ISIC C1610–C1629/NACE C16.10–C16.29):** Engineered timber and wood products that extend the productive use of harvested biomass, improve material efficiency and enable cascading use of wood across successive applications.
- **Environmental and ecological restoration (ISIC A0240, M7490/NACE A02.40, M74.90):** Green bonds, sustainability-linked lending and project finance to native forest restoration operators, carbon credit project developers and ecosystem service providers, increasingly backed by verified carbon credit revenues and biodiversity offset frameworks.
- **Waste collection and treatment—fiber recycling (ISIC E3811–E3830/NACE E38.11–E38.32):** Collection, sorting and recycling of paper, wood fiber and other recoverable forest products to substitute recycled inputs for virgin timber and extend material use.
- **Construction and real estate (ISIC F4100–F4290/NACE F41.10–F42.99):** Use of engineered timber, recycled wood and other circular wood products in construction, extending the productive use of harvested biomass and substituting for more resource- and emissions-intensive materials.

4.3 Practical implementation across PRB action categories

The tables provide a non-exhaustive list of actions banks can take to embed circular land solutions into each of the four PRB action categories, as well as their expected impact on terrestrial ecosystems and biodiversity at the client level. The final column indicates the business model category, and the color-coding highlights the specific circular solution area. Actions listed in this table are non-exhaustive and may be adapted to each bank's portfolio composition, geographic footprint and institutional capacity.

4.3.1 Policies, processes and culture

Banks can integrate circularity considerations into existing risk assessment, KYC and environmental and social due diligence processes for land-intensive activities. Relevant considerations may include the extent to which clients rely on land expansion, resource-intensive production or virgin biomass, as well as their adoption of circular practices such as agroforestry, regenerative production, forest regeneration, cascading use and recycling of biomass. Banks can also embed circularity into sectoral policies and financing criteria, strengthen data collection and portfolio impact analysis to better understand relevant exposures and impacts, and build staff capacity to identify and manage related risks and opportunities. An illustrative set of actions is presented in Table 9.

Table 9: Actions to integrate circular terrestrial solutions into policy, processes and culture, and expected impact (non-exhaustive)

Circular forestry | Reducing pressure from agricultural land-use change | Across all solution areas

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Due diligence, risk assessment and other internal processes		
Integrate circular land-use considerations into relevant environmental and social due diligence, KYC and credit-risk assessments, considering reliance on land expansion, resource-intensive production and virgin biomass, as well as opportunities to maintain, regenerate and make more productive use of land and forest resources.	Helps banks identify financially material risks associated with land-use pressures while highlighting opportunities for circular transition and targeted engagement.	Across value chain
Sectoral policies and other internal processes		
Reflect circular land-use considerations in relevant sectoral policies and financing frameworks, including land conversion, regenerative production, forest resource management and the circular use of agricultural and forest biomass.	Provides a consistent basis for incorporating circularity into sector-level decision-making and supporting reduced pressure on terrestrial ecosystems.	Across value chain

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Data collection and management		
Strengthen collection and use of relevant client and portfolio data on land use and circularity, where material and available, including land-use change, agricultural productivity, forest cover, biomass use, resource efficiency and recycled material inputs. Banks may draw on tools and datasets such as ENCORE, Global Forest Watch and relevant geospatial or commodity-level data to complement client-reported information.	Improves visibility of portfolio-level land-use pressures and circularity opportunities, supporting more targeted engagement and financing.	Across value chain
Portfolio impact analysis		
Assess portfolio exposure to land-use pressures and circular transition opportunities, considering land-intensive sectors, commodity supply chains, geographic context and reliance on land expansion or virgin biomass, complemented where relevant by biodiversity footprinting and land-use scenario analysis.	Helps identify portfolio segments with significant terrestrial ecosystem impacts and prioritize engagement and financing opportunities.	Across value chain
Capacity building and training		
Develop training for board members, employees and relationship managers on terrestrial ecosystem dependencies and land-use risks, circular land-use models, and relevant tools and frameworks for client assessment and engagement.	Builds the institutional knowledge needed to identify, assess and support circular transitions in land-intensive sectors and supply chains.	Across value chain

4.3.2 Client engagement

Effective client engagement can help banks understand how clients' production models, supply chains and land-use decisions contribute to pressure on terrestrial ecosystems, while identifying opportunities to support more circular and resource-efficient approaches. Engagement can focus on how clients can maintain or increase economic value from existing land and biomass resources, reduce reliance on land expansion and develop new revenue streams through practices such as agroforestry, forest restoration and cascading use of biomass. This can also help banks identify clients with credible transition pathways and potential financing needs.

The priorities for engagement will differ across agricultural producers, commodity traders, food and beverage companies, forestry operators and other land-intensive businesses. For agricultural and food-sector clients, discussions may focus on productivity and resource efficiency on existing land, circular use of agricultural residues and by-products, and supply-chain models that reduce pressure for further agricultural expansion. For downstream food retailers and consumer goods companies, engagement can focus on their influence over agricultural supply chains, including supplier engagement, traceability, sustainable sourcing and opportunities to support circular production models, with appropriate financing solutions supporting measurable progress where relevant.

For forestry and timber clients, engagement may explore forest restoration, efficient utilization of harvested biomass, cascading use and recycling of wood and fiber. Across sectors, engagement may consider the local social and economic context, including the interests and capacity of smallholder farmers, rural communities, Indigenous communities and other groups whose livelihoods depend on land and natural resources. Table 10 provides illustrative actions across the client engagement cycle, from initial dialogue and assessment through to support, financing and monitoring. For further details, see *Guidance on Client Engagement* by UNEP FI (2024e).

Table 10: Actions to integrate circular terrestrial solutions into client engagement, and expected impact (non-exhaustive)

Circular forestry Reducing pressure from agricultural land-use change Across all solution areas

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Scene setting and opening dialogue		
Engage agricultural, forestry and food-sector clients to understand land-use dependencies, resource use and circularity opportunities, and introduce the bank's expectations and available support for more circular land and biomass use.	Establishes early awareness of land-use pressures and circular opportunities, creating a basis for client transition planning and engagement.	Across value chain
Needs assessment and awareness raising		
Assess clients' circularity ambitions, current practices and transition needs, considering land-use pressures, resource efficiency, biomass use, supply-chain dependencies and opportunities for circular business models.	Provides a basis for tailored engagement and helps identify where changes in production and supply-chain practices could reduce pressure on terrestrial ecosystems.	Across value chain
Explore agricultural clients' opportunities to improve land productivity and reduce reliance on agricultural expansion, including through agroforestry, regenerative practices, diversified production and circular use of agricultural residues.	Supports more productive and resilient use of existing agricultural land and reduces pressure for conversion of natural ecosystems.	Circular design and production
Explore forestry and timber clients' opportunities to increase forest regeneration and circular use of wood and fiber, including cascading applications, product longevity and recycling.	Maintains and regenerates forest resources and reduces demand for virgin forest inputs.	Circular use; circular value recovery

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Defining support plans		
Develop client support plans that define relevant transition actions, investment needs, milestones and information requirements, with the scope and pace tailored to the client's business model and starting point.	Translates circularity ambitions into practical transition pathways and helps align investment with measurable improvements in land and resource use.	Across value chain
Where relevant, help clients assess complementary revenue streams from circular and ecosystem-based activities, such as sustainable commodities, recovered biomass, ecosystem services and other nature-related revenues.	Can strengthen the business case for maintaining and regenerating terrestrial ecosystems and support more diversified and resilient land-use models.	Across value chain
Designing and offering products and services to implement support plans		
Offer financing solutions that support measurable circular land-use outcomes, including sustainability-linked loans, green bonds, project finance and appropriate supply-chain finance.	Provides capital for investments that improve land productivity, regenerate ecosystems, increase resource efficiency and extend the use of biomass.	Across value chain
Explore financing for agricultural transitions such as agroforestry, regenerative production, sustainable intensification and circular use of agricultural residues, including where investments are distributed across multiple producers.	Reduces pressure for agricultural expansion, improves soil and ecosystem functions and creates additional value from agricultural biomass.	Across value chain
Explore financing for forest restoration and circular forest-product value chains, including regeneration, engineered wood, cascading use, fiber recovery and recycling.	Supports forest regeneration while extending the productive use of harvested biomass and reducing demand for virgin forest resources.	Across value chain
Monitoring		
Monitor relevant client and portfolio indicators to assess progress against agreed circularity and land-use objectives, using client-reported data and other relevant sources where available.	Provides evidence of progress and helps identify where further engagement or support may be needed.	Across value chain

4.3.3 Portfolio composition and financing

Circular land-use models present opportunities for banks to expand financing across agricultural production, forestry, food and beverage supply chains and related activities, while managing exposure to activities associated with unsustainable land conversion and deforestation. Financing approaches can include sustainability-linked loans linked to land-use and resource-efficiency indicators, informed by ICMA guidance on nature-related uses of proceeds (ICMA, 2025) project finance for restoration and circular forest-product value chains, and supply-chain finance supporting more sustainable sourcing. Emerging instruments such as biodiversity and ecosystem-service credits may also create complementary revenue streams for conservation and restoration activities as methodologies, market infrastructure and demand develop. For banks, these mechanisms could support project revenues and help structure financing for land-based investments, although their early-stage nature and associated integrity risks warrant careful assessment. Blended finance and other risk-sharing structures can also help mobilize commercial capital where sustainable land-use investments face higher risks or limited bankability. Illustrative actions banks can take to support the transition to more circular land-use models are provided in Table 11 below.

Table 11: Actions to integrate circular terrestrial solutions into portfolio composition and financing, and expected impact (non-exhaustive)

Circular forestry Reducing pressure from agricultural land-use change Across all solution areas

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Increasing circular financing with positive impact		
Increase financing for sustainable intensification and resource-efficient agricultural production, including precision agriculture, improved soil management, diversified production and other approaches that increase productivity on existing farmland.	Increases productivity on existing agricultural land and reduces pressure for further expansion into natural ecosystems.	Circular design and production
Increase financing for agroforestry, silvopasture and regenerative production systems that integrate trees, crops and livestock, improve soil and biomass cycling, and generate multiple outputs from existing land.	Maintains soil and ecosystem functions, diversifies production and reduces pressure for conversion of natural ecosystems.	Circular design and production
Increase financing for circular agricultural value chains, including the productive use of agricultural residues and by-products and their recovery as inputs, feed, soil amendments or other products.	Reduces resource losses and demand for additional land and virgin inputs while creating additional value from existing agricultural production.	Circular value recovery

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Increase financing for forest regeneration and restoration, including reforestation, assisted natural regeneration and other approaches that restore degraded forests and maintain productive forest cover.	Restores forest ecosystems, rebuilds habitat and ecosystem functions and helps maintain forest resources over the long term.	Circular design and production
Increase financing for circular wood and fiber value chains, including engineered timber, cascading use of wood, product longevity and recycling of wood and fiber.	Extends the productive use of harvested biomass and reduces demand for virgin forest resources and pressure on primary forests.	Circular use; circular value recovery
Use green bonds, sustainability-linked financing and other appropriate instruments to finance circular terrestrial activities, with nature-related green bond frameworks informed by ICMA guidance on eligible uses of proceeds.	Mobilizes capital for activities that reduce land-use pressure, regenerate terrestrial ecosystems and improve the productive use of land and biomass.	Across value chain
Consider blended finance and other risk-sharing structures for circular land-use investments facing material scale, affordability or bankability constraints.	Helps mobilize additional capital for circular and regenerative activities that may otherwise struggle to reach commercial scale.	Across value chain
Decreasing financing with negative impact		
Consider enhanced due diligence and, where appropriate, transition criteria for activities associated with significant land-use conversion or degradation, particularly where credible transition pathways are absent.	Supports a gradual reduction in exposure to key pressures on terrestrial ecosystems, including habitat conversion and unsustainable agricultural expansion.	Across value chain

4.3.4 Stakeholder engagement and partnerships

By partnering with public, private and civil society actors, banks can help mobilize blended finance, strengthen circular land-use value chains and scale investment in circular land management. Such collaboration also provides access to technical expertise, scientific evidence and emerging best practices, strengthening banks' ability to assess nature-related risks and opportunities across land-based sectors. Table 12 provides an overview of potential actions banks can take.

Table 12: Actions to integrate circular terrestrial solutions into stakeholder engagement and partnerships, and expected impact (non-exhaustive)

Circular forestry Reducing pressure from agricultural land-use change Across all solution areas

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Engaging with policymakers		
Engage policymakers and standard-setting bodies, directly or through industry platforms, on enabling conditions for circular land-use models, including sustainable land-use frameworks, restoration incentives, responsible biomass markets and relevant disclosure and reporting approaches.	Supports policy and market conditions that can improve the commercial viability and scaling of circular land-use activities and reduce pressures on terrestrial ecosystems.	Across value chain
Partnering with other financial institutions, including development finance institutions		
Partner with DFIs to explore blended-finance platforms for circular land-use investments, including regenerative agriculture, agroforestry, forest restoration and circular forest-product value chains in markets where commercial risks or limited project scale constrain bank participation.	Helps mobilize commercial capital for circular land-use activities in higher-risk markets and supports the scaling of activities that reduce pressure on terrestrial ecosystems.	Across value chain
Engage other commercial banks through industry platforms to share approaches to land-use risk assessment and circularity, including relevant data, metrics and approaches for assessing portfolio impacts and opportunities.	Promotes greater consistency in assessing terrestrial ecosystem risks and circularity opportunities and can strengthen collective capacity for client engagement.	Across value chain
Explore collaboration with insurers, institutional investors and other financial institutions on risk-sharing and investment structures for land restoration and circular land-use activities, where appropriate.	Can help address investment risks and mobilize additional private capital for restoration, regenerative production and circular land-use models.	Across value chain

Actions to integrate circular terrestrial solutions into nature strategies and targets (bank level)	Impact on terrestrial ecosystems (client level)	Circular business model category
Engaging with industry initiatives, civil society and academia		
Engage industry initiatives, civil society organizations, research institutions and relevant community and Indigenous organizations to strengthen the bank's understanding of circular land-use solutions, implementation challenges and credible practices.	Helps ground client engagement and financing approaches in local ecological, social and economic contexts and supports more credible circular land-use transitions.	Across value chain
Participate in relevant finance and multi-stakeholder platforms to share financial-sector perspectives on circular land use, financing barriers and market development.	Supports development of enabling conditions, standards and financing approaches that can facilitate investment in circular land-use activities and ecosystem restoration.	Across value chain

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Annex 1: Case studies on operationalizing the nexus between circular economy and nature

About the case studies

This compilation is a collection of eleven case studies received from nine member banks. Its purpose is to serve as an inspiration for banks and the broader community by showcasing how some 'early mover' banks are integrating circularity into their policies and processes through client engagement, and aligning portfolios and direct investments to operationalize the nexus between circular economy and nature across ocean and marine, freshwater, and terrestrial and land ecosystems.

The case studies have been compiled based on insights gathered from member banks and publicly available information. They offer practical examples of supporting clients in the integration of circular business models across the value chain and of implementation of relevant financial products and policies, illustrating how circular economy models can be put into action while upholding the Principles for Responsible Banking, with the objective to generate positive impact and decrease negative impact across impact areas.

Disclaimer

The case studies are examples of actions taken by signatories to the Principles for Responsible Banking to support circularity. The examples are highlighted to demonstrate positive, first steps on operationalizing the nexus between circular economy and nature. The examples referred to in these case studies represent each named bank's own individual progress and action, reflective of their business activities, country context and sustainable banking strategies.

The collation of these case studies should in no way be construed as suggesting that the banks represented have worked together on any form of collective action. While collecting case studies may have been inspired and supported by circular economy workstreams convened by UNEP FI, their consolidation and publication within this Annex does not represent an endorsement by UNEP FI as to the quality or correctness of the banks' individual action reported within public disclosures.

In the same way, none of the banks, nor any of their subsidiaries, branches, directors, officers or employees accepts any liability for any loss, direct or indirect, that may result from the use of this information nor offers any warranty, either express or implicit, regarding its accuracy, integrity or correctness. None of the banks are responsible for updating these contents or for giving notice of such changes. This document and its contents do not constitute an offer, invitation or solicitation to purchase, divest or enter into any interest in any assets or instruments. The case study summary box shown with each case study represents UNEP FI's own categorization assessment based on the relevant bank's public disclosures and, amongst other things, aims to highlight how the nexus between circular economy and nature is being operationalized through each individual bank's policies and processes, client engagement, portfolio composition and financing, and stakeholder engagement and partnerships.

Case study listing

Bank	Case study	Nexus	PRB Action Category*	Sector(s)	Circular business model category
Banco de Bogotá	Sustainable Financing and Bond Issuance Supporting Circular Economy Activities	Circular Economy, Climate Mitigation, Nature & Biodiversity, Resource Efficiency	3	Various sectors	Across the value chain
江苏银行 BANK OF JIANGSU	Eco-environmental Infrastructure Loan	Circular Economy, Freshwater Systems, Nature & Biodiversity, Resource Efficiency, Climate Mitigation, Healthy and Inclusive Economies	3	Various sectors	Circular support
	VEP Backed Financing for Ecological Restoration and Circular Urban Infrastructure Development	Circular Economy, Freshwater Systems, Climate Mitigation, Nature & Biodiversity, Resource Efficiency, Healthy and Inclusive Economies	3	Various sectors	Across the value chain
بنك الإمارات دبي الوطني Emirates NBD	Blue Bond for Ocean and Water-Related Finance	Nature & Biodiversity, Climate Mitigation, Healthy and Inclusive Economies	1, 3	Water	Circular value recovery, Circular support
بنك أبوظبي الأول FAB First Abu Dhabi Bank	Blue Bond for Sustainable Water Resource Management	Climate Adaptation, Climate Mitigation, Resource Efficiency, Water Security, Nature & Biodiversity	3	Water	Across the value chain
GOLOMT BANK Investing for a brighter future	Blue Financing for Circular Water Infrastructure and Inclusive SME Development	Circular Economy, Freshwater Systems, Water Supply, Sanitation, Climate Mitigation, Resource Efficiency, Healthy and Inclusive Economies	3	Water	Circular use, Circular support

Bank	Case study	Nexus	PRB Action Category*	Sector(s)	Circular business model category
INTESA SANPAOLO	Financing Circular Industrial Transition and Resource Efficient Production	Circular Economy, Terrestrial and Land Systems, Climate, Nature & Biodiversity	3	Various sectors	Circular support
SOCIETE GENERALE	Project Financing for Circular Water Infrastructure Supporting Green Steel Production	Circular Economy, Freshwater Systems, Climate Mitigation, Nature & Biodiversity, Resource Efficiency, Healthy and Inclusive Economies	3	Water	Circular value recovery
NORINCHUKIN	Financing Circular Agriculture through Biochar Solutions	Circular Economy, Terrestrial and Land Systems, Nature & Biodiversity, Resource Efficiency, Climate Mitigation	2,3	Agri-food	Across the value chain
UniCredit	One4Planet Water Resources Financing	Circular Economy, Freshwater Systems, Resource Efficiency, Climate Mitigation, Healthy and Inclusive Economies	3	Water	Circular support
UniCredit INTESA SANPAOLO	Sustainability-Linked Financing for Circular Manufacturing and Resource Efficiency	Circular Economy, Freshwater Systems, Climate Mitigation, Nature & Biodiversity, Resource Efficiency, Healthy and Inclusive Economies	3	Pulp and Paper Manufacturing	Circular support

***PRB Action Category**: 1: Policies, Processes and Culture; 2: Client Engagement; 3: Portfolio Composition and Financing ; 4: Stakeholder engagement and Partnerships

Banco de Bogotá

Sustainable Financing and Bond Issuance Supporting Circular Economy Activities

Sector	Multi-sector (Waste Management, Water Management, Energy, Agriculture, Manufacturing, Infrastructure/ Construction, Real Estate)
Region	LAC—Colombia
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Climate Mitigation; Nature & Biodiversity; Resource Efficiency
Stakeholders involved	Banco de Bogotá; corporate clients (SMEs and large corporates); public sector entities; investors in sustainable bonds; external assurance providers; development finance institutions
Circular business model category	Across value chain (Circular design and production, Circular use, Circular value recovery, Circular support)

What?

Banco de Bogotá channels capital toward circular economy and sustainability-related activities through a combination of lending operations and sustainable bond issuance.

Through its Sustainable Financing Framework, the bank enables the financing and refinancing of eligible activities across both corporate and public sector clients. The Framework includes a dedicated Circular Economy category, designed to support clients in transitioning from linear to circular business models, extending product lifecycles, and reducing waste generation. Eligible activities under this category include material recycling and reuse, waste valorization, eco-design and sustainable product design, composting, and other initiatives that promote more efficient and circular use of resources and materials across value chains.

In addition to the Circular Economy category, the Sustainable Financing Framework supports investments in other sustainability-focused areas, including waste management systems, resource recovery and recycling infrastructure, energy and resource-efficient production processes, renewable energy, sustainable agriculture, and climate-resilient infrastructure.

Banco de Bogotá has also mobilized capital through its Sustainable Subordinated Bond, issued to support a broad set of eligible environmental and social activities, including circular economy-related investments.

Who?

Banco de Bogotá acts as the structuring and allocating institution, integrating sustainability considerations into both lending decisions and capital markets issuance.

The bank works with corporate clients and SMEs investing in resource efficiency and environmental improvements, as well as public sector entities supporting infrastructure and transition-related

projects. Investors participate through sustainable bond subscriptions, while external reviewers provide independent assessment of alignment with recognized sustainable finance standards.

Development finance institutions and other financial stakeholders may also contribute to co-financing and broader market development in support of sustainable investment flows.

Why?

The approach reflects increasing financial exposure to resource dependency, environmental degradation, and transition-related risks across key sectors of the economy.

Linear production and consumption systems increase reliance on virgin materials and generate waste and inefficiencies that can translate into higher operational costs, supply chain vulnerabilities, and exposure to regulatory and environmental transition pressures.

By financing activities that improve material efficiency, enable resource recovery, and reduce environmental impact, the bank supports more resilient business models that are less exposed to resource scarcity and environmental constraints. This also contributes to strengthening long-term portfolio stability in sectors most affected by resource and climate transition dynamics.

How?

Banco de Bogotá operationalizes its approach through structured lending processes and capital markets issuance aligned with its Sustainable Financing Framework.

Eligible activities are assessed during credit origination and integrated into financing decisions alongside financial risk considerations. Approved transactions are financed through standard lending products or through proceeds from sustainable bond issuance, depending on the structure of the transaction.

Proceeds from the Sustainable Subordinated Bond are allocated to eligible categories defined under the framework, with ongoing monitoring of allocation and environmental performance indicators. External reviewers provide independent assurance to ensure consistency with recognized sustainable finance standards.

The bank also continues to address the challenge of identifying projects and business activities that have already been financed but were not initially recognized as circular economy initiatives. To strengthen its ability to capture these opportunities, Banco de Bogotá provides ongoing training to its commercial teams on circular economy principles and broader sustainability topics.

Through this combined lending and capital markets approach, the bank directs financial flows toward activities that improve resource efficiency and support more circular and resilient economic systems.

For more information, please see:

- Banco de Bogotá's sustainable financing framework

Bank of Jiangsu

Eco-environmental Infrastructure Loan

Sector	Multi-sector (Eco-environmental Infrastructure, including Wastewater Treatment, Solid-waste Treatment and Utilization, Ecological Restoration, Environmental Monitoring and Risk-control Facilities)
Region	APAC Eastern Asia - People's Republic of China, Jiangsu Province
PRB action category	Portfolio Composition and Financing (structured green lending with fiscal interest subsidies; risk-sharing or guarantee support may be layered where eligible to scale environmental investment)
Nexus with which Impact area(s)	Circular Economy, Freshwater Systems, Nature & Biodiversity, Resource Efficiency, Climate Mitigation, Healthy and Inclusive Economies
Stakeholders involved	Bank of Jiangsu; Jiangsu Provincial Department of Ecology and Environment; Jiangsu Provincial Department of Finance; Jiangsu Branch of the People's Bank of China; eligible project sponsors and enterprises
Circular business model category	Circular support

What?

In 2023, Jiangsu Province launched the Eco-environmental Infrastructure Loan (环基贷), a specialized green finance policy instrument designed to expand financing for eco-environmental infrastructure projects.

The case illustrates how fiscal interest subsidies and policy-bank/commercial-bank coordination can help commercial banks scale financing for eco-environmental infrastructure and enterprise green transition projects.

The programme is primarily an interest-subsidy mechanism to reduce financing barriers for pollution-control, wastewater treatment and resource-efficiency investments. Where projects also qualify under the Jiangsu Eco-Environmental Loan or Eco-Environmental Guarantee schemes, risk-compensation or guarantee support may be layered with the interest subsidy. The provincial finance department complemented the structure through interest subsidies that evolved from 0.5% in the 2023 scheme to 1% under the 2024 rules and 1.5% under the 2026 optimization, retroactive to eligible loans from 1 January 2025.

The financing supported projects related to wastewater treatment, solid-waste treatment and utilization, ecological restoration, environmental monitoring and risk-control facilities, pollution reduction and environmental infrastructure construction. From a circular economy perspective, the programme supports investments in cleaner production systems, industrial water reuse, waste reduction and more resource-efficient operations.

By the time of public reporting in January 2026, the province-level programme had supported 20 projects, mobilized RMB 10.27 billion in financing and disbursed approximately RMB 100 million in cumulative provincial subsidies. Bank of Jiangsu's cumulative interest subsidies obtained through the Eco-environmental Infrastructure Loan, the Jiangsu Eco-Environmental Loan and other innovative green finance products exceeded RMB 11 million, with the subsidy scale ranking first in Jiangsu Province.

Who?

Bank of Jiangsu participated in the Eco-environmental Infrastructure Loan as part of its broader green finance strategy focused on resource efficiency, pollution reduction and environmental risk management.

The bank collaborated with the Jiangsu Provincial Department of Ecology and Environment, which led the policy framework together with the Jiangsu Provincial Department of Finance. The Jiangsu Provincial Department of Finance provided interest subsidies to reduce borrower financing costs, while the People's Bank of China Jiangsu Branch appears in the later policy optimization, monitoring and evaluation framework.

Eligible project sponsors and enterprises accessed the financing to implement pollution-control, wastewater treatment and industrial resource-efficiency projects across Jiangsu Province.

Why?

Bank of Jiangsu used the programme to address financing gaps affecting eco-environmental infrastructure and green transition projects, which are often perceived as higher-risk or insufficiently collateralized despite their environmental benefits.

The structure reduced financing costs for borrowers while using fiscal interest subsidies to lower eligible borrowers' effective financing costs; additional guarantee or risk-compensation support may apply only where projects qualify for related policy instruments. This enabled Bank of Jiangsu to expand green lending exposure to eligible projects and enterprises while supporting projects that improved water quality, reduced industrial emissions and promoted more efficient resource use.

The facility also supported circular economy transition measures by enabling investments in industrial water reuse, cleaner production processes and pollution-control infrastructure designed to reduce resource leakage and environmental pressure across industrial activities.

How?

Bank of Jiangsu operationalized the Eco-environmental Infrastructure Loan through a multi-stakeholder financing mechanism combining fiscal interest subsidies, cooperation-bank credit approval and policy coordination.

Cooperation banks independently conduct credit approval, contract signing and loan disbursement; risk-compensation or guarantee support may apply only through eligible related policy instruments. The provincial finance department complemented the structure through fiscal interest subsidies that evolved from 0.5% to 1%, and later to 1.5% under the 2026 optimization, reducing borrower financing costs and improving the affordability of environmental transition investments.

The facility targeted projects related to wastewater treatment, pollution-control infrastructure, solid-waste treatment and utilization, ecological restoration, environmental monitoring and risk-control facilities, pollution reduction, and selected enterprise equipment renewal or technical retrofit projects with significant pollution-reduction potential. By reducing financing barriers for these activities, the

programme supported circular economy transition measures across multiple sectors, particularly through investments enabling cleaner production systems, industrial water reuse and more efficient resource management.

Programme implementation and environmental performance were monitored through provincial subsidy tracking, project reporting and environmental management processes to ensure accountability and transparency.

For more information, please see:

- Jiangsu Eco-environmental Infrastructure Loan implementation scheme
- Jiangsu fiscal-finance policy handbook
- Xinhua Daily / JSChina.com report on the 2026 policy optimization
- Bank of Jiangsu 2025 Green Finance Development Report
- Bank of Jiangsu 2024 Green Finance Development Report

Bank of Jiangsu

VEP Backed Financing for Ecological Restoration and Circular Urban Infrastructure Development

Sector	Multi-sector (Water Management, Construction, Urban Development, Environmental Services, Digital Economy)
Region	APAC—People's Republic of China, Zhejiang Province
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Freshwater Systems; Climate Mitigation; Nature & Biodiversity; Resource Efficiency; Healthy and Inclusive Economies
Stakeholders involved	Bank of Jiangsu; Anji X Construction Development Co., Ltd.; Anji County Government; Independent VEP appraisal agencies; Local environmental and water authorities; Residents of Anji
Circular business model category	Across value chain (Circular design and production, Circular use, Circular value recovery, Circular support)

What?

In 2023, Bank of Jiangsu structured an ecosystem-product-value (VEP) pledge loan to support an ecological-oriented development (EOD) project in Zhejiang Province, China. The financing combined ecological restoration, circular water management, and resource-efficient urban development within a single project finance structure.

As part of the loan structuring process, the bank incorporated a VEP assessment that quantified ecosystem services generated by freshwater, land, and forest ecosystems in the project area. The assessment covered regulating and cultural ecosystem services, including water conservation, flood regulation, climate regulation, and recreation value. These quantified ecosystem-service values formed an important basis for the pledgeable ecological asset and collateral structure.

Bank of Jiangsu approved more than RMB 1.6 billion (approximately US$ 220 million) in financing for Phase I construction through a long-term loan aligned with the ecological restoration cycle.

The financing supported wetland rehabilitation, river restoration, wastewater treatment and water-reuse systems, resource-efficient buildings, green public infrastructure, and digital-economy facilities.

According to the VEP accounting report, the project's first-year ecological product value was estimated at approximately RMB 18 million annually, including around RMB 6 million from regulating services and around RMB 12 million from cultural services. From a circular economy perspective, the financing supported infrastructure designed to restore and reuse natural resources within the urban system. Wastewater treatment and reuse systems reduced freshwater demand, while wetland restoration and ecological infrastructure improved natural water filtration, rainwater infiltration, and flood buffering capacity.

Who?

Bank of Jiangsu acted as the main reported lender for the VEP-backed financing mechanism. The bank integrated ecosystem-service valuation into its lending approach as part of its broader green finance strategy focused on resource efficiency, biodiversity protection, and climate resilience.

The bank collaborated with Anji X Construction Development Co., Ltd., which implemented the project, and with the Anji County Government, which supported the initiative through ecological restoration funding and policy coordination.

Independent VEP appraisal agencies conducted ecosystem-service valuation and supported the use of ecological product value within the collateral structure, while local environmental and water authorities monitored environmental performance throughout implementation.

Why?

Bank of Jiangsu developed the financing structure to support projects combining ecological restoration with long-term economic development while addressing financing constraints often associated with environmental infrastructure projects.

The financing enabled investments in circular water infrastructure, including wastewater treatment, reclaimed-water reuse and wetland rehabilitation, helping reduce pressure on freshwater resources and improve water quality. Resource efficient buildings and green infrastructure were integrated into the development model to support more resilient urban growth.

The project also demonstrated how ecosystem services can be translated into financial value and integrated into lending structures. By linking ecological restoration to asset value creation, the financing model created a regenerative investment cycle in which improvements in ecosystem quality strengthened the long-term value of the project area.

The project is expected to support more than RMB 2 billion in annual digital-economy output and create more than 3,000 jobs.

How?

Bank of Jiangsu operationalized the financing through an integrated VEP-EOD model combining ecosystem valuation, project finance and environmental performance monitoring.

An independent assessment of quantified ecosystem services generated within the project area, including water conservation, flood regulation, and recreation value. The resulting ecological product value supported the ecological asset account and pledgeable collateral structure for financing.

Using this structure, Bank of Jiangsu extended more than RMB 1.6 billion in long-term credit for the project's first development phase. The financing tenor was aligned with the ecological restoration and construction timeline, aligned with the project construction and ecological restoration cycle. Government-supported ecological restoration funds contributed part of the project equity, while the VEP-backed loan financed environmental remediation, circular water infrastructure and resource-efficient urban construction.

The financing supported circular economy outcomes through investments in wastewater treatment facilities, reclaimed-water reuse systems, wetland rehabilitation, and green infrastructure integrated into urban design. Environmental performance was monitored through VEP assessment and local project management systems tracking indicators such as sewage treatment rates, water quality, ecological waste treatment, and green-space expansion.

Reported outcomes included an approximately 98% sewage treatment rate, treatment of around 7,800 tonnes of ecological waste, and green-space expansion across the project area.

For more information, please see:

Bank of Jiangsu: "VEP+EOD" Integrated Innovation

Emirates NBD

Blue Bond for Ocean and Water-Related Finance

Sector	Sustainable Finance (Blue Economy, Marine Conservation and Sustainable Water)
Region	AME (United Arab Emirates)
PRB action category	Portfolio Composition and Financing; Policies, Processes and Culture
Nexus with which Impact area(s)	Nature & Biodiversity; Climate Mitigation; Healthy and Inclusive Economies
Stakeholders involved	Emirates NBD; Global ESG and institutional investors (including T. Rowe Price, Emirates NBD Capital, Citibank, HSBC, Mizuho, Standard Chartered, Société Générale), Marine and water-related financing recipients
Circular business model category	Circular value recovery, Circular support

What?

In 2026, Emirates NBD issued a US$ 300 million Blue Bond to mobilize capital towards marine conservation and sustainable water-related activities. The three-year Blue tranche forms part of the Bank's inaugural US$ 1 billion dual-tranche sustainable bond issuance, alongside a US$ 700 million five-year Green tranche.

The transaction represents the largest Blue Bond issued in the UAE and GCC, and the largest dual-tranche Blue-Green Bond issued by a financial institution globally. The issuance also positions Emirates NBD as a first mover among GCC banking institutions in the public Blue Bond market, supporting the development of blue finance as an emerging segment of the region's sustainable capital markets.

The bond was issued under Emirates NBD's updated Sustainable Finance Framework, which provides the basis for directing sustainable finance proceeds towards eligible activities. The transaction channels capital towards marine conservation, sustainable water projects and wider green initiatives, with the proceeds aligned with the objectives of SDG 14: Life Below Water and SDG 13: Climate Action.

Through the issuance, Emirates NBD uses public debt markets to connect institutional capital with ocean and water-related financing opportunities, expanding the role of sustainable finance instruments in supporting the blue economy.

Who?

Emirates NBD was the issuer of the Blue Bond, raising capital from institutional investors through the public debt market and allocating proceeds in accordance with its Sustainable Finance Framework.

Global ESG-focused investors provided the capital mobilized through the transaction. The issuance attracted strong investor demand, including participation from T. Rowe Price, a global asset manager active in blue investments, which subscribed to the Blue tranche as part of its focus on ocean and water-related sustainable finance.

Investor engagement also contributed to the development of the transaction, including dialogue on use of proceeds, key performance indicators and alignment with international blue finance guidance, demonstrating how issuer-investor collaboration can support the development of credible blue finance instruments.

The transaction was supported by Emirates NBD Capital, Citibank, HSBC, Mizuho, Standard Chartered and Société Générale as Joint Lead Managers and Joint Bookrunners. Emirates NBD Capital and Citibank also acted as Joint Sustainability Structurers, supporting the sustainability structure of the issuance.

Through these actors, the transaction connects Emirates NBD's sustainable finance activities with international capital markets and investors seeking exposure to marine and water-related environmental outcomes.

Why?

Marine ecosystems and water resources require significant investment, creating a need for financial mechanisms capable of directing private capital towards activities that support their conservation and sustainable management. Emirates NBD's Blue Bond provides a dedicated capital-market instrument through which financing can be mobilized for marine conservation and sustainable water projects.

The issuance also responds to the development of blue finance as an emerging segment of sustainable capital markets. By bringing a sizeable Blue Bond to the public market and attracting global ESG-focused investors, Emirates NBD seeks to broaden access to financing linked to the blue economy while demonstrating institutional investor demand for ocean and water-related sustainable finance.

How?

Emirates NBD operationalized the initiative by issuing the Blue Bond as a dedicated three-year US$ 300 million tranche within a larger US$ 1 billion dual-tranche sustainable bond under its Euro Medium Term Note Programme. The bonds were issued through a public offering and are dual-listed on Euronext Dublin and Nasdaq Dubai, providing access to international capital-market investors.

The use of proceeds is governed by Emirates NBD's Sustainable Finance Framework. The framework provides the structure through which proceeds from sustainable financing instruments are directed towards eligible activities, with the Blue Bond supporting financing linked to marine conservation and sustainable water projects.

The issuance incorporates defined use-of-proceeds requirements and governance arrangements and adheres to the International Capital Market Association Green Bond Principles while aligning with emerging Blue Bond guidelines. These mechanisms are intended to provide investors with greater transparency regarding the sustainability purpose of the capital raised.

By combining a labelled Blue Bond, a sustainable finance framework, public-market issuance and participation from international ESG investors, Emirates NBD created a mechanism for mobilizing private capital towards the blue economy. The scale and structure of the transaction also provide a potential model for further blue bond issuance, helping expand the pool of capital available for marine conservation and sustainable water-related activities in the region.

Beyond the immediate capital mobilization, the transaction provides a potentially replicable model for future blue bond issuances by financial institutions in the region, helping broaden the pool of capital available for marine conservations and sustainable water-related activities.

The transaction demonstrates how banks can use labelled debt instruments to mobilize institutional capital towards environmental priorities related to marine ecosystems and water resources while contributing to the development of a broader market for blue finance.

For more information, please see:

- Emirates NBD Completes Landmark Transaction with Largest Dual-Tranche Blue-Green Bond Issued by a Financial Institution Globally
- Emirates NBD ESG Update 2026

First Abu Dhabi Bank

Blue Bond for Sustainable Water Resource Management

Sector	Banking; Water infrastructure
Region	AME (United Arab Emirates)
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Climate Adaptation; Climate Mitigation; Resource Efficiency; Water Security; Nature & Biodiversity
Stakeholders involved	First Abu Dhabi Bank; project developers; sustainable bond investors; independent external verifiers
Circular business model category	Across value chain (Circular design and production, Circular use, Circular value recovery, Circular support)

What?

In 2025, First Abu Dhabi Bank (FAB) issued two private placement blue bonds totalling US$ 70million (US$ 50m and US$ 20m) to finance water-related infrastructure, climate adaptation solutions, and blue-economy activities. The financing supports projects designed to protect and regenerate water-based natural capital while improving long-term resource efficiency.

The bonds are use-of-proceeds instruments aligned with FAB's Sustainable Finance Framework, the International Capital Market Association (ICMA) Green Bond Principles, and the International Finance Corporation (IFC) blue finance guidance. Proceeds were allocated to eligible projects including wastewater treatment, water recycling and circular water-use infrastructure.

Funded projects include wastewater treatment facilities with a combined capacity of 430,000 m^3 per day, enabling large-scale water recycling and reducing reliance on freshwater resources. Financing also supported a renewable energy-powered desalination plant producing 37 million litres per day through the use of solar energy and battery storage. Together, these projects strengthen water security while delivering low-carbon benefits.

Through the blue bond, FAB increased financing for projects that preserve the long-term productivity of marine and freshwater ecosystems while supporting sustainable economic activities linked to water resources.

Who?

First Abu Dhabi Bank acted as the issuer of the blue bonds and managed the allocation of proceeds to eligible blue-economy and water-related projects in line with its Sustainable Finance Framework.

FAB collaborated with project developers and other stakeholders implementing activities focused on sustainable water management, wastewater treatment, water recycling, and circular water infrastructure.

The private placements were placed with few international investors, including an EU based investment fund, which is classified as a "Dark Green" fund under Article 9 of the EU's Sustainable

Fund Disclosure Regulation. This means that it has an explicit sustainable investment focus and puts strict limits on the assets it can invest in.

Why?

FAB developed its blue bond programme to increase financing for projects that address growing pressures on marine and freshwater ecosystems, while responding to the Middle East's acute water scarcity challenges, Driven by drought conditions and the depletion of freshwater resources, The initiative supports investments that improve water quality, reduce resource depletion and enhance resilience. The financing also addresses the high energy intensity of conventional desalination and the need for more reliable, low-carbon infrastructure.

Circular water infrastructure, including wastewater treatment and water reuse systems, help extend water lifecycles, reduce environmental pressure on freshwater resources and minimize wastewater discharge. At the same time, investments in renewable energy-powered desalination strengthens long-term operational resilience and energy security.

By directing financing toward these activities, FAB supports water security and climate resilience while addressing a systemic regional risk with implications for agriculture and industrial growth across GCC economies, demonstrating how thematic bond frameworks can scale investment in sustainable water infrastructure.

How?

FAB implemented the initiative through its Sustainable Finance framework, which defines how proceeds raised through the bond could be allocated to eligible blue-economy and water-resource projects.

The Bank raised capital through the issuance of a dedicated blue bonds issuances and allocated proceeds to projects that support sustainable water-resource management and circular water-use systems. Eligible activities included wastewater treatment, water recycling infrastructure, marine ecosystem restoration and sustainable coastal management projects.

Projects were assessed through FAB's internal sustainability review and selection process to ensure alignment with the Sustainable Finance Framework's environmental criteria and intended sustainability outcomes. Independent external reviewers verified the framework and confirmed that financed activities materially contributed to sustainable water-resource management and ecosystem protection.

FAB also applied an Environmental and Social (E&S) risk assessment in accordance with FAB's Environmental and Social (E&S) Risk Framework and the use of the Equator Principles to mitigate environmental and socials risks from the projects. The EU Green taxonomy criteria were referenced in the assessment process to ensure that the desalination facility was being powered in a way that met their investor's expectations.

For more information, please see:

- Sustainable Finance Impact Report 2025
- Blue Bond Factsheet Aug'25
- First Abu Dhabi Bank—Sustainable Finance and Blue Bond Information

Golomt Bank

Blue Financing for Circular Water Infrastructure and Inclusive SME Development

Sector	Multi-sector (Water Management, Energy Efficiency, SMEs / Small and Medium-sized Enterprises, Women-Led Businesses)
Region	APAC—Mongolia
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Freshwater Systems; Water Supply, Sanitation, Climate Mitigation; Resource Efficiency; Healthy and Inclusive Economies
Stakeholders involved	Golomt Bank; International Finance Corporation (IFC); Proparco; BlueOrchard; SMEs; Women-Led Businesses.
Circular business model category	Circular use; Circular support

What?

In 2025, Golomt Bank mobilized a US$ 160 million syndicate financing package with the International Finance Corporation (IFC), Proparco and BlueOrchard to support blue finance, and inclusive SME development in Mongolia. Furthermore, Golomt bank received a two-tranche senior loan totaling US$ 13 million from WaterEquity, aimed at improving access to clean water and sanitation facilities in Mongolia.

With the support of these financial institutions, Golomt bank was a pioneer to implement blue financing products to Mongolia's market, these initiatives focuses on investments that improve water efficiency, reduce pressure on freshwater resources and strengthen sustainable water management infrastructure.

Under the structure of the IFC financing package, up to 60% of the funds were allocated to environmental projects, including water efficiency, sanitation, water supply and energy-efficiency investments, while up to 25% was dedicated specifically to blue finance activities. The remaining proceeds are allocated to support small and medium enterprises (SMEs), particularly women-led businesses.

From a circular economy perspective, these initiatives financed projects designed to improve resource efficiency and strengthen water-cycle management. Eligible activities included water-saving technologies, sanitation infrastructure and energy-efficient systems aimed at reducing water losses, lowering resource consumption and improving long-term resource productivity.

The initiative also contributed to expanding access to sustainable finance and strengthening economic resilience in Mongolia.

Who?

Golomt Bank acted as the implementing financial institution and allocated financing to eligible environmental and SME projects as part of its broader sustainable finance strategy. The bank collaborated with IFC, which led the financing package, while Proparco and BlueOrchard participated as co-financing partners helping mobilize international capital for sustainable investment in Mongolia. In addition, the Bank expanded its partnership with WaterEquity and secured dedicated funding

to supporting initiatives aimed at improving access to safe drinking water and sanitation.SMEs, particularly women-led and rural enterprises, were the main beneficiaries of the initiative.

Why?

Golomt Bank developed the initiative to address limited access to financing for water-related infrastructure and environmentally sustainable SMEs in Mongolia, particularly in sectors facing growing resource and climate-related pressures.

The financing supported investments that improve water efficiency, sanitation and energy-efficient infrastructure, designed to reduce water losses, enhance resource management, and strengthen long-term environmental resilience. By promoting more efficient use of water and energy resources, the initiative contributed to circular resource flows and reduced environmental pressure.

The programm also aimed to expand financing access for SMEs, women entrepreneurs, and rural businesses, supporting economic diversification, job creation and resilience.The initiative aligned with Golomt Bank's sustainability targets, including commitments to reduce climate impact by 30% and reduce impacts on water resources by 5% by 2030.

The case illustrates how banks can use blended finance structures to expand blue finance markets and channel capital toward circular water and resource-efficient investments in emerging economies.

How?

Golomt Bank implemented the initiative through a structured sustainable finance approach combining international financing mobilization, targeted allocation mechanisms and environmental eligibility criteria.

Golomt Bank mobilized the US$ 160 million financing package together with IFC, Proparco and BlueOrchard, and allocated the financing across eligible environmental and SME projects according to predefined sustainability categories. Also, the Bank received a two-tranche senior loan totaling US$ 13 million from WaterEquity, aimed at improving access to clean water and sanitation facilities in Mongolia.

Up to 60% of the IFC financing package was directed toward environmental projects, including water efficiency, sanitation, water supply, and energy-efficiency investments. Up to 25% was specifically allocated to blue finance activities supporting sustainable water management and related infrastructure. Whereas, under the WaterEquity loan, 100% of the proceeds are dedicated to financing initiatives that improve access to safe drinking water and sanitation.

The financing supported circular economy outcomes through investments in water-saving technologies, sanitation systems and energy-efficient infrastructure designed to reduce water losses, improve resource efficiency, and strengthen long-term water management capacity.

To support implementation integrity and impact measurement, financed activities were aligned with IFC sustainability standards and Golomt Bank's internal environmental targets. This framework helped establish environmental eligibility criteria, improve impact monitoring, and reduce greenwashing risks.

For more information, please see:

- Golomt Bank Blue Finance Initiative
- Golomt Bank WaterEquity
- Golomt Bank supports acccess to clean water and sanitation projects

Intesa Sanpaolo

Financing Circular Industrial Transition and Resource Efficient Production

Sector	Multi-sector (Manufacturing, Industrial Production, Construction, Waste Management, Food & Beverage)
Region	EU—Western Europe (Italy)
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Terrestrial and Land Systems; Climate; Nature & Biodiversity
Stakeholders involved	Intesa Sanpaolo; corporate and SME clients; institutional investors; Intesa Sanpaolo Innovation Center
Circular business model category	Circular support

What?

Intesa Sanpaolo has developed a sustainable finance approach that integrates circular economy criteria into its broader sustainable lending framework. Through green loans, ESG-linked financing instruments and dedicated circular economy solutions, the bank finances projects that improve resource efficiency, reduce waste generation and extend product and material lifecycles.

The framework envisages a range of circular economy activities across industrial value chains, including resource-efficient manufacturing processes, use of recycled and secondary raw materials, durable and repairable product design, remanufacturing, refurbishment and reuse models.

Eligible investments include circular production systems, industrial waste recovery processes, circular construction solutions and initiatives designed to reduce material intensity across supply chains.

From a circular economy perspective, the financing supports industrial models that retain products, materials and resources within the economy for longer periods while reducing dependence on virgin raw materials and limiting waste generation.

Who?

Intesa Sanpaolo has implemented the framework through its lending and capital markets activities, also supported by the Intesa Sanpaolo Innovation Center. The bank works with corporate and SME clients across multiple sectors to identify and finance circular economy investments.

Institutional investors participated through sustainable bond and ESG-linked financing instruments, while external assurance providers verified alignment with sustainability standards and reporting frameworks where applicable. Finance is the Group's most powerful lever to support the circular transition at scale.

The Group has also pioneered capital-market instruments for circular initiatives, including green and social bonds and CE securitizations. In 2025, Intesa Sanpaolo completed its third synthetic securitization operation focused on ESG and CE objectives. Intesa Sanpaolo was the first Italian bank to issue a green bond in 2017. Since then, green funding has become a key component of the Group's sustainable finance strategy.

In the Wealth & Asset Management Division, the Group promotes circularity in investment strategies and advisory. Eurizon Capital SGR is a market leader in CE investments. Its flagship fund, Eurizon Fund—Equity Circular Economy, invests in companies advancing circular models based on criteria such as product life extension, waste reduction and use of renewable resources.

Why?

Intesa Sanpaolo has developed the approach to support the transition toward more resource-efficient and lower-impact production systems while strengthening industrial competitiveness and reducing environmental pressures across value chains.

The financing supports investments designed to reduce virgin material consumption, increase secondary material use and improve industrial resource productivity. Circular production and use models also contribute to extending product lifecycles and reducing emissions associated with material extraction, manufacturing and waste disposal.

In addition to climate and efficiency benefits, the approach indirectly supports nature-related outcomes by reducing extraction pressures, industrial pollution and waste generation across supply chains.The case illustrates how banks can integrate circular economy criteria into sustainable finance frameworks and client engagement processes to scale financing for industrial transition and resource-efficiency projects.

How?

Intesa Sanpaolo has operationalized the approach by embedding circular economy eligibility criteria within its sustainable lending framework.

The bank provides green loans dedicated to circular economy purposes or ESG-linked loans, financing solutions for projects linked to resource efficiency, secondary material integration, waste reduction and product-life extension—among others. Eligible activities include recycled material use, remanufacturing systems, circular construction materials, industrial recovery processes and resource-efficient production technologies.

Projects are assessed based on their contribution to circular economy objectives and broader environmental performance criteria, including waste reduction, resource productivity and emissions performance. The Intesa Sanpaolo Innovation Center supports project evaluation and client advisory activities related to circular transition planning.

In relation to fundable projects and initiatives, circular eligibility is assessed against an updated scheme—revised in 2026 in collaboration with the Ellen MacArthur Foundation and aligned with the IFC Harmonized Circular Economy Finance Guidelines - with the support of ISPIC.

Allocated financing and project performance are monitored and reported also through sustainability disclosure frameworks with external verification applied where contractually requested.

For more information, please see:

- Intesa Sanpaolo Innovation Center—Circular Economy Initiatives

Société Générale

Project Financing for Circular Water Infrastructure Supporting Green Steel Production

Sector	Water Resources Management (Banking/Financial Services)
Region	EU—Nordics and Baltic region
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Freshwater Systems ; Climate Mitigation; Nature & Biodiversity; Resource Efficiency; Healthy and Inclusive Economies
Stakeholders involved	Société Générale; Stegra (formerly H2 Green Steel); John Laing Group; Aquatech; EKN (Exportkreditnämnden); institutional lenders; external assurance providers
Circular business model category	Circular value recovery

What?

In 2024, Société Générale structured and underwrote the non-recourse financing of a new water treatment plant (WTP) supporting Stegra's green steel project in Boden, Sweden. Developed through a Private-to-Private Partnership between John Laing Group and Stegra, the WTP provides critical infrastructure for one of the world's first large-scale green steel production facilities.

The plant supplies demineralized water for hydrogen electrolysers, provides purified cooling water and treats wastewater generated during steel production.

A central feature of the project is its Near-zero liquid discharge (NZLD) management system, which is expected to recirculate approximately 99.9% of process water back into the industrial system. This reduces freshwater abstraction, limits wastewater discharge and improves industrial resource efficiency. From a circular economy perspective, the infrastructure was designed to minimize resource leakage and enhance water circulation within the steel production process.

The financing was structured as a Green Loan aligned with the Loan Market Association (LMA) Green Loan Principles. Société Générale has been mandated as sole underwriter, structuring bank, lead mandated arranger, agent and account bank.

Who?

Société Générale coordinated the transaction as lead structuring bank, sole underwriter and senior lender. The bank mobilized multiple financing instruments to support the delivery of the water infrastructure project.

The bank collaborated with Stegra, formerly H2 Green Steel that it previously financed through a Green Loan and which is developing the green steel production facility and will use the water treatment services within its industrial operations. John Laing Group participated as long-term infrastructure investor through the Private-to-Private Partnership structure, while Aquatech provided the water treatment technology and operational expertise.

EKN (Exportkreditnämnden), Sweden's export credit agency, supported the financing through an 80% green credit guarantee. External assurance providers reviewed the transaction's alignment with Green Loan Principles and sustainability criteria.

Why?

Société Générale structured the financing to support industrial infrastructure combining decarbonization objectives with circular water management.

The project enabled large-scale water reuse within the steel production process, reducing freshwater demand and limiting wastewater discharge. The Near-zero liquid discharge (NZLD) design also strengthened operational resilience by reducing exposure to water supply constraints and future environmental compliance costs.

In addition to improving resource efficiency, the infrastructure supports green hydrogen production for low-carbon steelmaking, contributing to emissions reductions in one of the most carbon-intensive industrial sectors.

The transaction demonstrates how project finance structures can support circular industrial infrastructure that simultaneously advances water resilience, resource efficiency and industrial decarbonization. It also highlights the growing role of water infrastructure in enabling low-carbon manufacturing systems.

For Société Générale, the transaction aligned with the bank's broader sustainable finance and net-zero objectives while demonstrating its ability to structure complex financing solutions for industrial transition projects.

How?

Société Générale operationalized the transaction through a non-recourse project financing structure aligned with the LMA Green Loan Principles.

The financing package combined commercial debt facilities, reserve and contingent facilities, and an EKN-backed covered facility designed to optimize risk allocation and improve project bankability. The structure aligned long-term infrastructure financing with contracted industrial water-service revenues, improving cash-flow predictability and supporting investment in a first-of-its-kind industrial water system.

From a circular economy perspective, the financing enabled infrastructure designed to maintain water circulation within industrial operations. The WTP supports large-scale process-water reuse, reduces wastewater discharge and improves industrial resource efficiency through Near-zero liquid discharge (NZLD) water management.

External assurance providers reviewed the financing framework and confirmed alignment with Green Loan Principles and sustainability requirements.

The transaction represents an important example of how sustainable project finance structures can mobilize capital for circular industrial infrastructure supporting both resource efficiency and industrial decarbonization.

For more information, please see:

- Société Générale—Stegra Water Treatment Plant Financing Announcement

The Norinchukin Bank

Financing Circular Agriculture through Biochar Solutions

Sector	Agriculture / Food Systems
Region	APAC (Japan)
PRB action category	Client engagement Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Terrestrial and Land Systems; Nature & Biodiversity; Resource Efficiency; Climate Mitigation
Stakeholders involved	The Norinchukin Bank, TOWING Ltd., agricultural producers, cooperatives, agribusinesses, technology providers, valuechain partners
Circular business model category	Across value chain (Circular production, Circular use, Circular value recovery and Circular support)

What?

The Norinchukin Bank has partnered with TOWING Ltd. to promote the use of Soratan, a high-performance biochar produced from plant and food-processing residues generated in Japan. The initiative supports the transition toward more circular and sustainable agricultural systems by converting biological residues into productive agricultural inputs rather than allowing these resources to be discarded or underutilized.

Soratan is produced by carbonizing plant and food-processing residues into biochar, adding soil microorganisms selected by TOWING, and cultivating the material with organic fertilizers. When applied to agricultural land, the resulting product can improve soil functions while storing carbon in the soil over extended periods.

Through a business partnership agreement, the Norinchukin Bank supports TOWING in expanding the adoption and sales channels of Soratan by leveraging the Bank's networks and knowledge across Japan's agriculture and food sectors. The initiative also explores the generation and intermediation of carbon credits associated with carbon sequestration achieved through biochar application.

By returning agricultural and food-system residues to productive use, the partnership creates a circular flow of biological resources while contributing to soil improvement, reduced dependence on conventional agricultural inputs, carbon sequestration and more resilient agricultural production. The Norinchukin Bank supports the transition of food and agriculture value chains toward systems that are more resource-efficient, resilient, and nature-positive.

Who?

The Norinchukin Bank acts as a strategic and financing partner to TOWING, helping connect the company's biochar technology with agricultural producers, cooperatives, food companies and other participants across the food and agriculture value chain.

TOWING develops and markets Soratan and provides the technological expertise required to convert plant and food-processing residues into high-performance biochar. The company also applies for and sells carbon credits generated through carbon sequestration associated with the use of biochar on agricultural land.

Farmers and agricultural producers apply Soratan to farmland, where it functions as a soil improvement material while storing carbon in the soil. Food and agriculture-related companies may also participate through the purchase or intermediation of carbon credits generated by the initiative.

Through its extensive relationships within Japan's agriculture, forestry and fisheries sectors, the Norinchukin Bank helps connect these different actors and expand the market for biochar-based agricultural solutions.

Why?

In Japan, reducing reliance on chemical fertilizers manufactured using imported raw materials and fossil fuels has been identified by the Ministry of Agriculture, Forestry and Fisheries as an important component of the transition toward more sustainable food systems. The Norinchukin Bank recognizes that climate change, biodiversity loss, resource constraints, and soil degradation present interconnected challenges across food and agriculture value chains.

The partnership between the Norinchukin Bank and TOWING addresses these challenges by creating productive uses for agricultural and food-processing residues. Instead of being treated as waste, biomass residues are converted into biochar and returned to agricultural soils, helping close biological resource loops within the food system.

The approach can generate multiple environmental benefits simultaneously. Biochar can support soil functions and the sustainable management of agricultural natural capital while sequestering carbon that would otherwise return to the atmosphere. Greater use of recycled biological resources can also improve resource efficiency and contribute to reducing dependence on externally sourced agricultural inputs.

The initiative therefore demonstrates how circular economy solutions within agriculture can contribute not only to waste and resource-management objectives, but also to soil health, climate mitigation and the long-term resilience of food production systems.

How?

The Norinchukin Bank advances food and agriculture value chain transition by mobilizing finance, fostering partnerships, and facilitating collaboration across the agriculture, forestry and fisheries sectors.

TOWING produces Soratan using plant and food-processing residues, which are carbonized and added to organic fertilizers to create biochar. This is then applied to farmland as a soil improvement material. The Norinchukin Bank supports the expansion of this model by leveraging its networks, sector knowledge and relationships with agricultural producers, cooperatives, and agribusinesses.

This demonstrates how circular resource flows can be strengthened while enhancing soil functions and contributing to climate and nature outcomes.

For more information, please see:

- The Norinchukin Bank—Reducing the Environmental Burden in Agriculture
- The Norinchukin Bank Sustainability Information

UniCredit

One4Planet Water Resources Financing

Sector	Water Resource Management / Multi-sector Corporate Water Efficiency
Region	EU—Western Europe (Italy)
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Freshwater Systems; Resource Efficiency; Climate Mitigation; Healthy and Inclusive Economies
Stakeholders involved	UniCredit; UniCredit Corporate Customers; Water Management Companies; Corporate borrowers investing in water management and wastewater treatment project
Circular business model category	Circular support

What?

In 2025, UniCredit launched a new product on water resources within its One4Planet product range, designed to address the increasing need for sustainable water resource management and wastewater treatment in Italy. The product specifically supports corporate clients, particularly small and medium-sized enterprises, seeking to invest in projects that reduce water waste, improve water efficiency and enable water reuse.

The initiative targets companies operating in sectors with significant water consumption, including manufacturing industries such as food, chemicals, metallurgy, textiles, machinery and electronics, as well as agriculture, forestry, fishing, healthcare and water utility companies.

From a circular economy perspective, the financing supports investments that improve the efficient use of water resources, reduce losses throughout water systems, promote wastewater treatment and encourage the reuse of treated water and sludge, helping retain resource value within economic systems for longer. Recently, the financing was extended to cover additional product sub-categories, among which Sustainable Water Management is particularly noteworthy, as it supports improvements in water efficiency through process optimization and the implementation of high-efficiency technologies.

Who?

UniCredit acts as the product developer and financing provider through its ESG and sustainable finance activities. The bank offers dedicated financing solutions to corporate customers wishing to invest in projects related to water management infrastructure and wastewater treatment systems.

The main beneficiaries are UniCredit corporate customers undertaking investments aimed at improving water management, reducing water losses, implementing water reuse solutions or enhancing wastewater treatment processes. Potential recipients include water utility companies and businesses with high water consumption across multiple economic sectors.

Why?

The initiative was launched within the broader context of UniCredit's ESG strategy and commitment to protecting natural capital. Through its transition plan and sustainable finance activities, UniCredit aims to support clients in their transition towards more sustainable business models while contributing to environmental protection and long-term economic resilience.

One4Planet—Water Resources was designed to respond to growing concerns regarding water scarcity and the need for sustainable water management. Water plays a critical role across the economy, supporting manufacturing industries, agricultural production and renewable energy generation. Protecting water resources therefore contributes not only to environmental sustainability, but also to economic development, business competitiveness and community well-being.

The initiative demonstrates how dedicated financing products can support investments that improve water efficiency, encourage resource conservation and strengthen circular management of water throughout the economy.

How?

UniCredit operationalized the initiative through a Use-of-Proceeds financing structure dedicated to projects involving water management and wastewater treatment. The product was launched with a promotional commercial initiative offering reduced financing rates from the second half of 2025 through the end of 2026. Financing can extend from 2 to 15 years for unsecured loans and up to 20 years where secured by a mortgage.

The bank established a monitoring framework based on specific environmental performance indicators reported through ICMA surveys and tracked via internal dashboards. For water management projects, key indicators include kilometres of water pipeline built or renovated, cubic metres of water transported or processed, annual water savings and infrastructure leakage indices.

For wastewater treatment projects, indicators include the annual quantity of untreated, treated and disposed wastewater sludge, the quantity and percentage of sludge reused, and the volume of wastewater treated, reused or avoided.

Through this approach, UniCredit integrates circular economy considerations into its financing activities by supporting investments that reduce water losses, increase water reuse, improve wastewater treatment outcomes and encourage more efficient management of critical natural resources.

For more details, please see:

- One4Planet—Water Resources
- UniCredit ESG and Sustainability Strategy

UniCredit & Intesa Sanpaolo

Sustainability-Linked Financing for Circular Manufacturing and Resource Efficiency

Sector	Pulp and Paper Manufacturing (Hygiene and Tissue Products)
Region	EU—Western Europe
PRB action category	Portfolio Composition and Financing
Nexus with which Impact area(s)	Circular Economy; Freshwater Systems; Climate Mitigation; Nature & Biodiversity; Resource Efficiency; Healthy and Inclusive Economies
Stakeholders involved	UniCredit; Intesa Sanpaolo; Lucart Group; sustainability-linked loan investors; external assurance providers
Circular business model category	Circular support

What?

In 2022, UniCredit provided a Sustainability-Linked Loan (SLL) to Lucart Group to support investments in circular manufacturing and industrial resource-efficiency improvements within the tissue and hygiene products sector, with a pool of other 6 financial institutions (BNL BNP Paribas, Banco BPM, BPER Banca, Crédit Agricole Italy, Intesa Sanpaolo and Mps Capital Services). The transaction is backed by a guarantee, provided by SACE, the Italian state-owned export credit and insurance agency, aimed at supporting the growth and investment plans of Italian companies. UniCredit and Intesa Sanpaolo also acted as Sustainability Coordinator, Facility Agent, and SACE Agents.

UniCredit structured the financing to support machinery upgrades and process optimization measures designed to reduce water and energy consumption and minimize manufacturing waste across Lucart's production operations.

The transaction formed part of UniCredit's broader sustainable finance activities integrating circular economy considerations into corporate lending structures. According to Lucart Group, nearly half of the company's debt portfolio is linked to ESG-related commitments.

From a circular economy perspective, the financing supported manufacturing systems designed to improve resource productivity, strengthen water and reduce waste generation across industrial production processes.

In 2024, UniCredit renewed its support to Lucart Group with another sustainability linked loan, in order to reinforce the investments supporting the circular economy and the implementation—within the production chain—of plant and machinery offering greater water and energy efficiency.

Who?

UniCredit and Intesa Sanpaolo acted as Sustainability Coordinators, Facility Agent and SACE Agents. UniCredit acted through its corporate and sustainable finance teams. Circular manufacturing and environmental performance considerations were included into the financing structure by linking loan conditions to measurable sustainability and resource-efficiency targets.

UniCredit supported with Lucart Group, which implemented the machinery upgrades and operational improvements within its manufacturing facilities.

Why?

UniCredit is committed to support the creation of a circular economy across its countries, ensuring a tangible contribution towards a just and fair transition. In 2022 it became member of the Ellen MacArthur Foundation international charity Network to accelere the circular economy transition. It developed the financing structure to support clients investing in circular business models and manufacturing assets that improve resource productivity, reduce dependence on virgin raw materials and strengthen long-term operational resilience.

The financing enabled Lucart Group to invest in technologies that reduced water and energy consumption and minimized production waste within manufacturing processes. These measures supported circular production models by retaining material value within production cycles and reducing resource intensity across operations.

The investments also contributed to waste treatment, while helping reduce exposure to rising energy, water and material costs.

The case demonstrates how sustainability-linked lending can be used to finance circular manufacturing upgrades by linking financing conditions to measurable improvements in resource efficiency and production performance.

How?

UniCredit operationalized the financing through its sustainability-linked lending framework, linking financing conditions to environmental and circular economy performance indicators.

The bank assessed eligible investments focused on industrial process optimization, including machinery and technology upgrades designed to improve water recirculation, and waste reduction within manufacturing operations. Financing conditions were aligned with sustainability performance targets agreed jointly with the client.

Throughout the loan period, UniCredit monitored progress against agreed environmental and resource-efficiency KPIs.

Through this approach, UniCredit integrated circular economy considerations into corporate lending by supporting industrial investments aimed at improving manufacturing efficiency, reducing production waste and lowering operational resource intensity across the value chain.

For more details, please see:

- UniCredit—Lucart EUR 101m financing article (IT)
- Da UniCredit un nuovo finanziamento per potenziare gli investimenti in economia circolare—LUCART GROUP

Annex 2: Non-exhaustive list of tools for measuring biodiversity impacts

Materiality tools	
ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)	ENCORE helps users to better understand how different sectors and sub-sectors potentially depend on and impact natural capital, and how these potential dependencies and impacts can pose a business risk.
SBTN Materiality Screening Tool	The Materiality Screening Tool aims to assist companies in making high-level selections of material economic activities based on their contribution to the drivers of biodiversity loss and pressure.
Mapping tools	
WWF Risk Filter Suite	WWF Risk Filter Suite helps businesses to identify, assess and manage nature-related risks. The tool includes a Biodiversity Risk Filter and Water Risk Filter.
Biodiversity Indicators for Site-based Impacts (BISI)	BISI offers evaluation and guidance on requirements, existing methods and potential indicator models, alongside a tool providing a reliable and replicable methodology for choosing biodiversity indicators. This includes a systematic approach to using these indicators to evaluate the ecological environment's status, biodiversity pressure and responses at corporate levels.
IBAT (Integrated Biodiversity Assessment Tool)	IBAT is an online platform that provides interactive mapping tools, which enable users to visualize and analyze biodiversity data spatially, tailored to aid decision-making in biodiversity conservation and natural resource management.
Footprinting tools	
Biodiversity footprint calculation method by University of Jyväskylä	A method developed by University of Jyväskylä allows companies to calculate their biodiversity footprint in their value chain and own operations. The methodology integrates scientific databases, accounting and commercial data to measure the impacts of business activities on nature.
Global Biodiversity Score (GBS)	GBS is a biodiversity footprint assessment tool, which can cover the entire value chain. This tool aggregates the contributions of different types of pressure into a single biodiversity score for simple communication and tracking.

Inclusion of a particular tool in this annex does not constitute an endorsement of that tool or its provider by UNEP FI or the Principles for Responsible Banking. The tool landscape evolves rapidly; links were current at the time of publication and readers may refer to the maintained source for the latest version.

UN environment programme

finance initiative

UNEP Finance Initiative brings together a large network of banks, insurers and investors that catalyzes action across the financial system to deliver more sustainable global economies.

For more than 30 years the Initiative has been connecting the UN with financial institutions from around the world to shape the sustainable finance agenda. We've established the world's foremost sustainability frameworks, helping the finance industry achieve sustainability goals, address sustainability risks and identify the business opportunities in taking a responsible approach to banking and insurance.

Convened by a Geneva, Switzerland-based secretariat, more than 550 banks and insurers are individually implementing UNEP FI's Principles for Responsible Banking and Principles for Sustainable Insurance. Financial institutions work with UNEP FI on a voluntary basis to apply these industry frameworks and develop practical guidance and tools that drive institutional change, shaping the future of sustainable finance and positioning their businesses for the transition to a sustainable and inclusive economy. In parallel, UNEP FI also drives systems change and fosters enabling conditions in service of the broader mission to mobilize and align private finance to help achieve the UN Sustainable Development Goals.

Founded in 1992, UNEP FI was the first organization to engage the finance sector on sustainability and incubated the Principles for Responsible Investment, now the world's leading proponent of responsible investment.

Today, we cultivate leadership and advance sustainable market practice while supporting the implementation of global programmes at a regional level across Africa & the Middle East, Asia Pacific, Europe, Latin America & the Caribbean, and North America.

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